# University of Illinois

1892-93

In childhood and in the earliest period of education have more care for the health of the body than for the mind, and for the moral character than for the intellectual. Let nothing base or servile, vulgar or disgraceful, meet the eye or assail the ear of the young ; for from words to actions is but a step. Let their earliest and first impressions of all things be the best. Let them be taught fully all the essential elements of education and as much of what is useful in a merely mechanical point of view as will have the effect of rendering the body, the soul, and the intellectual powers capable of arriving at the highest excellence of their respective natures. The merely useful, or absolutely necessary matters of education are not the only ones that deserve attention, but to these should be added such as exalt and expand the mind and convey a sense of what is beautiful and noble. For to be looking everywhere to the merely useful, is little fitted to form an elevated character, or a liberal mind.—*Aristotle.*

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# CATALOGUE

OF THE

# UNIVERSITY OF ILLINOIS

URBANA, CHAMPAIGN CO., ILL.

(Post Office, Champaign, Ill.)

1892-93

PUBLISHED BY THE UNIVERSITY



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# UNIVERSITY OF ILLINOIS.

The University of Illinois has its seat in Champaign county, in the eastern central part of the state, between the twin cities of Champaign and Urbana, within the corporate limits of the latter. It is one hundred and twenty-eight miles southward from Chicago, at the junction of the Illinois Central, the Cleveland, Cincinnati, Chicago and St. Louis, and the Wabash railways. The situation is a beautiful one and the "art that doth mend nature" has added rare charms to the grounds and surroundings. The country around is one of the richest and most prosperous agricultural regions of the world, and the local municipalities, with a combined population of 11,000, are noted for public spirit and high moral tone.

## HISTORY.

Unlike most of the states admitted into the Union after its formation, Illinois had no state university during the early years of its history. The attempts made from time to time to found one were not successful in the legislature. But at length a number of public spirited citizens, conspicuous among whom was Professor J. B. Turner, of Jacksonville, vigorously agitated the question and earnestly advocated the establishment by the state of an institution in which instruction might be given "upon all those studies and sciences of whatever sort which tend to throw light upon any art or employment which any student may desire to master, or upon any duty which he may be called to perform, or which may tend to secure his moral, civil, social and industrial perfection as a man." These ideas were embodied in a bill introduced in the General Assembly in 1855, but owing to the late position on the calendar the bill failed to become a law.

In the meantime the same parties in Illinois, uniting with others in different parts of the country, made strenuous efforts to secure aid from the national government. These efforts culminated in 1862 in an act giving to each state public land scrip apportioned in quantity equal to 30,000 acres for each senator and representative in congress, "for the endowment, support and maintenance of at least one college, whose

leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, * * * * * in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life."

Under this act Illinois received scrip for 480,000 acres of land subject to location in any surveyed but unoccupied part of the public domain. At this time the market value of the scrip was very low, and great difficulties seemed to present themselves in locating land upon it. But 25,000 acres were thus located in Nebraska and Minnesota, while the remainder of the scrip was sold for what could be obtained. In compensation for waiting something more than a quarter of a century, the land thus secured has added and will add to the endowment fund nearly as much as was obtained for the vastly greater proportion of the scrip originally sold. The entire principal sum received from the sale of scrip and of land is held inviolate as endowment, the income only being available for current expenditures.

To secure the location of the University several counties entered into sharp competition by proposing to donate to its use named sums of money, or its equivalent. Champaign county offered a large brick building, erected for a seminary, and nearly completed, about 1,000 acres of land for a campus and adjoining farms, and $100,000 in county bonds. To this the Illinois Central railroad added $50,000 in freight.

The state legislature has from time to time appropriated various sums for permanent improvements, as well as for maintenance. The present value of the entire property and assets is estimated at $1,182,000.00.

The institution was incorporated under the name of the Illinois Industrial University the last day of February, 1867, and placed under the control of a board of trustees constituted of the governor, the superintendent of public instruction, and the president of the state board of agriculture, as *ex-officio* members and twenty-eight citizens appointed by the governor. The chief executive officer, usually called president, was styled Regent and he was made, *ex officio*, a member of the board and presiding officer both of the board of trustees and of the faculty.

In 1873 the board of trustees was reorganized by the reduction of the number of members by appointment to nine and *ex officio* to two, the governor and the president of the state board of agriculture. In 1887 a law was passed making membership elective at a general state election and restoring the superintendent of public instruction as an *ex-officio* member. There are, therefore, now three *ex-officio* members and nine by

public suffrage. Since 1873 the president of the board has been chosen by the members thereof from among their own number, for a term of one year.

In consideration of the offer of Champaign county the institution was located, May 8, 1867, in the suburbs of Urbana adjoining those of Champaign. For greater convenience most use has been made of the post office of the latter place. The University was opened to students March 2, 1868, at which time there were present beside the Regent, three professors, and about fifty students mostly from the vicinity. During the first term another instructor was added, and there was a total enrollment of 77 students, all young men.

This was a small beginning, but plans had been formulated for a great institution of learning. In the first report of the committee on courses of study, adopted May 8, 1867, six general departments were outlined and under these there were named fifteen courses of study. The development of the University as it is now known is a remarkable fulfillment of the ideas of the founders as expressed in this notable document. The leading thought therein embodied, of a true collegiate education specially adapted to the industries as distinguished from the professions, was at the time essentially new in the actual organization of an institution of learning, and the plans then laid down were substantially original, though based upon the laws of congress and of the state and in part upon the discussions which led to their enactment, and though others were elsewhere at work upon the same problem. After describing the proposed University and its prospective benefit to the state the glowing enthusiam of the writers is thus expressed:

"Let the state open wide then this Pierian fount of learning. Let her bid freely all her sons to the full and unfailing flow; those whose thirst or whose needs are little to what they require; those whose thirst and whose capacities are large to drink their fill. Let the University be made worthy of the great state whose name it bears; worthy the grand and splendid industries it seeks to promote, and worthy of the great century in which we live."

From the small beginning in 1868 evident progress has been made, not only towards the embodiment of theoretical conceptions in actual courses of instruction, but also in the dissemination of the idea that education in its highest and widest reaches is appropriate for and helpful in all vocations and conditions of life, and that the possibility of securing it should be within the compass of all capable minds. On the one hand the general importance of such education in industrial as well as in professional pursuits has been acknowledged, and on the other the

duty of the state to provide it has been emphasized. With many obstacles encountered and various vicissitudes endured, the University itself and the central idea upon which it was founded have made long strides forward in fact and in public esteem.

During the first term classes were instructed in algebra, geometry, natural philosophy, history, rhetoric, and Latin. Along with this, work on the farm and gardens or around the buildings was compulsory for all students. But in March of the next year compulsory labor was discontinued, save when it was made to serve as a part of class instruction. A chemical laboratory was fitted up during the autumn of 1868, and students then began practical work in the department. Botanical laboratory work was commenced the following year. In January, 1870, a temporary mechanical shop was fitted up with tools and machinery, and in this little wooden building, originally constructed for a carpenter shop, was begun the *first shop-instruction* in American universities. During the summer of 1871, a large brick structure, the present Machinery Hall, was erected and equipped for students' shop work in both wood and iron, and in 1876 a diploma of merit was awarded for the exhibition in this line made at the Centennial Exposition.

By vote, March 9, 1870, the trustees admitted women as students, and during the year 1870-71, twenty-four availed themselves of the privilege. Since that time they have constituted about one-sixth to one-fifth of the total number of students. In 1875 a course in domestic science and art was organized. This was maintained five years, when, upon the withdrawal of the professor in charge, it was abandoned.

By the original state law certificates showing the studies pursued and the attainments in each were substituted for the usual diplomas and degrees. The certificates not proving satisfactory to the holders, the alumni petitioned the legislature in 1877 to give the University authority to confer degrees, and such authority was granted.

Again upon motion of members of the alumni, seconded by trustees and faculty, the legislature was asked in 1885 to change a former action by that body. The word *industrial*, as used in connection with public institutions, had become associated with those of a penal or reformatory kind, and, in consequence, many ludicrous and sometimes embarrassing mistakes were made as to the character and purpose of the Uuiversity. Instead of the splendid conception of high, collegiate education preparatory to and in aid of the great industries of the age, people were too often led to suppose the state had provided a place for destitute children or for young culprits. From the beginning the institution had been recognized as the state University and all the discussion leading to

its establishment was based upon this idea. No change was now sought in its character or in its relations, but a name better expressive to the public mind of that character and relation was desired; the Industrial University became the University of Illinois. For the year during which the change of name occurred there were 51 per cent of the students in technical courses: during this last year there are nearly 65 per cent in these courses.

During the same session of the legislature a bill was passed transferring the State Laboratory of Natural History from the Illinois State Normal University to the University of Illinois. This Laboratory was created by law for the purpose of making a natural history survey of the state, with the publication of the results in series of bulletins and reports; and for the allied purpose of furnishing specimens illustrative of the flora and fauna of the state to the public schools, and to the state museum. For these purposes direct appropriations are made by the legislature from session to session. A large amount of material has been collected and extended publications have been made in both the forms above mentioned. The Laboratary makes a large exhibit at the World's Columbian Exposition.

By an act approved March 2, 1887, the national government appropriated $15,000 per annum to each state for the purpose of establishing and maintaining, in connection with the colleges founded upon the congressional act of 1862, an agricultural experiment station "to aid in acquiring and diffusing among the people of the United States useful and practical information on subjects connected with agriculture, and to promote scientific investigation and experiment respecting the principles and applications of agricultural science." Under this provision the station for Illinois was placed under the direction of the trustees of the University and its grounds were located on the University farm. At least one bulletin of results is published every three months, and they are for gratuitous distribution. Editions of 13,000 copies are now issued.

For the more complete endowment of the state institutions founded upon the act of 1862, the congress of the United States made further appropriations by a supplementary law passed in 1890. Under this enactment each such college or university received the first year $15,000, the second $16,000, and likewise thereafter $1,000 per annum additional to the amount of the preceding year. The annual increase is to continue until the amount reaches $25,000, which sum is then to be paid yearly thereafter. Putting the congressional aids together there is made an exceedingly encouraging example for the state authorities to imitate. It cannot be said that the Illinois legislature has in the past contributed

liberally to the University; but a disposition to do so has been much more manifest in recent sessions of that body. Besides $70,000 for a science building, the 37th General Assembly (1891) appropriated for the use of the University for two years the sum of $65,044.23. At the date of this writing the 38th General Assembly has not completed its work in this respect. To date the total appropriations by the state to the University for all purposes whatsoever amount to $584,200.

It has been mentioned that 77 students attended the first term in 1868. The total enrollments for the succeeding years to the present are as follows: 128, 180, 274, 381, 400, 405, 368, 370, 388, 387, 399, 414, 382, 352, 382, 330, 332, 362, 343, 377, 417, 469, 519, 583, 714.

It will be noted that for the last ten years each year, with a single exception, shows a gain over that preceding. The last year's gain is much the greatest, reaching 21 per cent over the attendance for 1892 and nearly 40 per cent over that for 1891. The following table gives details of attendance since 1881-82:

ATTENDANCE OF STUDENTS IN THE SEVERAL DEPARTMENTS OF THE UNIVERSITY, FOR THE YEARS 1881–82 TO 1892–93.

| YEAR. | Agriculture | Mechanical Engineering | *Electrical Engineering | Civil Engineering | †Municipal and Sanitary Engineering | Mining Engineering | Architecture | †Architectural Engineering | Chemistry | Natural History | Art and Design | English and Modern Languages | Ancient Languages | Unclassified | Men | Women | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1881-82. | 21 | 41 | .... | 41 | .... | 3 | 14 | .... | 42 | 14 | 4 | 119 | 4 | 40 | 276 | 76 | 352 |
| 1882-83. | 28 | 39 | .... | 52 | .... | 3 | 18 | .... | 40 | 11 | 7 | 117 | 15 | 47 | 289 | 93 | 382 |
| 1883-84. | 24 | 45 | .... | 51 | .... | 2 | 21 | .... | 26 | 17 | 6 | 94 | 8 | 43 | 261 | 69 | 330 |
| 1884-85. | 21 | 56 | .... | 58 | .... | 1 | 26 | .... | 23 | 20 | 11 | 102 | 4 | 34 | 292 | 70 | 362 |
| 1885-86. | 25 | 53 | .... | 43 | .... | 3 | 24 | .... | 27 | 18 | 8 | 102 | 7 | 19 | 269 | 63 | 332 |
| 1886-87. | 29 | 65 | .... | 45 | .... | 4 | 28 | .... | 25 | 21 | 5 | 84 | 6 | 31 | 289 | 54 | 343 |
| 1887-88. | 23 | 57 | .... | 53 | .... | 4 | 46 | .... | 15 | 34 | 14 | 85 | 8 | 39 | 305 | 72 | 377 |
| 1888-89. | 16 | 74 | .... | 62 | .... | 6 | 59 | .... | 20 | 54 | 9 | 85 | 14 | 19 | 346 | 71 | 417 |
| 1889-90. | 14 | 78 | .... | 71 | .... | 6 | 61 | .... | 40 | 53 | 3 | 101 | 15 | 27 | 392 | 77 | 469 |
| 1890-91. | 22 | 78 | 1 | 95 | .... | 5 | 73 | .... | 51 | 51 | 4 | 95 | 17 | 27 | 444 | 75 | 519 |
| 1891-92. | 11 | 88 | 29 | 87 | .. . | 6 | 92 | .... | 45 | 53 | 7 | 104 | 17 | 44 | 494 | 89 | 583 |
| 1892-93. | 40 | 82 | 87 | 93 | 1 | 7 | 98 | 15 | 52 | 71 | 10 | 106 | 36 | 16 | 610 | 104 | 714 |

*Not separately classified until 1890-91.
†Not separately classified until 1892.

This shows that the marked increase has been in certain of the courses of engineering. The courses in architectural engineering and in

sanitary engineering are new with this year and the course in electrical engineering was established two years ago. The number of students pursuing architectural studies is greater than at any other collegiate institution in this country.

What the University now is and what it most needs can be seen by the presentation made in this catalogue, and by the very extensive exhibition of its material facilities and products in the Illinois building at the Columbian Exposition. That much has been accomplished may be granted; that much remains to be done is well recognized by those in charge.

## BUILDINGS AND GROUNDS.

The land occupied by the University and its several departments embraces about 610 acres, including stock farm, experimental farm, orchards, forest plantation, arboretum, ornamental grounds, and military parade grounds.

University Hall, designed wholly for public uses, occupies three sides of a quadrangle, measuring 214 feet in front and 122 feet upon the wings. The library wing contains in spacious halls the museum of natural history, the library, the art gallery, and the museum of industrial art. The chapel wing contains the chapel, the physical laboratory and lecture room, and rooms occupied by the departments of architecture, and of art and design. In the main front are convenient class rooms, and on the upper floor elegant halls for literary societies.

The Chemical Laboratory is a building 75 by 120 feet, and two stories high, besides well-lighted basement and mansard stories. It contains the general laboratories for students, instructors' laboratories, lecture rooms, store rooms, scale rooms, and various apartments for special purposes.

Machinery Hall is of brick, 126 feet in length, and 88 feet in width. It contains a boiler room, a machine shop furnished for practical use with a steam engine and lathes, and other machinery; pattern and finishing shop; testing laboratory; shops for carpentry and cabinet work, furnished with wood-working machinery. The blacksmith shop contains sixteen forges with anvils and tools, and a cupola for melting iron.

Natural History Hall is a handsome building 134 by 94 feet, with basement, two main stories, and an attic. It is occupied by the departments of botany, zoölogy, mineralogy, geology, and physiology, for each of which there are laboratories, lecture rooms, and offices.

Military Hall, 100 by 150 feet in one grand hall, gives ample space for company and battalion maneuvers and for large audiences

THE GYMNASIUM

upon special occasions. It is also used as a gymnasium, for which there are dressing rooms with lockers. A bath room is provided.

There are, in addition, a veterinary hall, a small astronomical observatory, three dwellings, two large barns, and a greenhouse.

## MUSEUMS AND COLLECTIONS.

The museum of zoölogy and geology occupies a hall 61 by 79 feet, with a gallery on three sides, and is completely furnished with wall, table, and alcove cases. It contains interesting and important collections, equaled at few, if any, of the colleges of the West. They have been specially selected and prepared to illustrate the courses of study in the school of natural history, and to present a synoptical view of the zoölogy of the state.

*Zoölogy.*—The mounted mammals comprise an unusually large and instructive collection of the ruminants of our country, including male and female moose, elk, bison, deer, antelope, etc.; and also several quadrumana, large carnivora and fur-bearing animals, numerous rodents, good representative marsupials, cetaceans, edentates, and monotremes. Fifty species of this class are represented by eighty specimens.

The collection of mounted birds (about five hundred and fifty specimens of three hundred species), includes representatives of all the orders and families of North America, together with a number of characteristic tropical forms. Many of these specimens are excellent examples of artistic taxidermy. A series of several hundred unmounted skins is available for the practical study of species.

The set of skeletons contains examples of all the orders of mammals and birds except the Proboscidia, together with typical representatives of the principal groups of reptiles, amphibians, and fishes.

The cold-blooded vertebrates are also represented by a very useful collection of alcoholic specimens, plaster casts, and mounted skins of the larger species, both terrestrial and marine.

Embryology is illustrated by a set of Ziegler wax models, and several series of slides, sections, and other preparations.

Conchology is illustrated by several thousand shells belonging to seventeen hundred species; together with alcoholic specimens of all classes and orders. The collection of Illinois shells is fair, but incomplete.

The entomological cabinet contains about three thousand species (principally American), named, labeled, and systematically arranged.

The lower invertebrates are represented by several hundred dried specimens and alcoholics, and by a large series of the famous Blaschka glass models.

*Botany.*—The herbarium contains nearly all the species of flowering plants indigenous to Illinois, including a complete set of grasses and sedges. The flora of North America is fairly well represented, and a considerable collection of foreign species has been made. A collection of fungi includes a very full set of those most injurious to other plants, causing rusts, smuts, moulds, etc. A collection of wood specimens from two hundred species of North American trees well illustrates the varieties of native wood.

Plaster casts represent fruits of many of the leading varieties, as well as interesting specimens of morphology, showing peculiarities of growth, effects of cross-fertilization, etc.

*Geology.*—The geological collection comprises many of the largest and most remarkable fossils hitherto discovered in the various geological formations, illustrating the general progress of life in the mollusks, fishes, reptiles, and mammals, from the oldest paleozoic time to the present. A fine set of fossils from Germany, and collections suitably arranged for practical study, from this and other states, illustrate the different formations. There is a good collection of foot-prints from the Connecticut river sandstones.

*Lithology.*—This collection embraces the principal kinds of metamorphic and volcanic rocks; examples of stratification in the limestone and fragmental kinds, with many samples of such rocks as are found most valuable for building purposes.

*Mineralogy.*—The specimens of minerals show all the groups, and all the important and typical species. All the metals are represented; also many of their most important combinations. Many of the specimens are finely crystalized; these, with a complete set of imported models, fully illustrate crystallography.

*Agriculture.*—A collection of soils from different portions of Illinois and other states; many varieties of corn, wheat, and other cereals and seeds; specimens illustrating the official state inspection of grains at Chicago, showing the quality of the different grades recognized; models of agricultural inventions; models illustrating modes and materials for drains; casts of ancient plows; engravings, lithographs, and photographs of typical animals of noted breeds.

The farms give good illustrations of farm buildings, implements, machinery, modes of culture, and of domestic animals of various classes.

*Physics.*—The cabinets of the physical laboratory contain a collection of apparatus from the most celebrated European and American makers, illustrating the subjects of mechanics, pneumatics, optics, and electricity.

A series of standard weights and measures from the office of the Coast and Geodetic Survey of the United States may be consulted at the physical laboratory.

### ART GALLERY.

The University art gallery was the gift of citizens of Champaign and Urbana. It occupies a beautiful hall 61 by 79 feet, and the large display of art objects has surprised and delighted all visitors. In sculpture it embraces thirteen full size casts of celebrated statues, including the Laocoön group, the Venus of Milo, etc., forty statues of reduced size, and a large number of busts, ancient and modern, bas reliefs, etc., making over four hundred pieces. It includes also hundreds of large autotypes, photographs, and fine engravings, representing many of the great masterpieces of painting of nearly all the modern schools. Also a gallery of historical portraits, mostly large French lithographs of peculiar fineness, copied from the great national portrait galleries of France. The value of this splendid collection, as a means of education, is shown in the work of the course of drawing and design of the University.

### MUSEUM OF INDUSTRIAL ARTS.

A large room is devoted to a museum of practical art, the materials for which are constantly accumulating in the various scientific departments. Prominent among the agricultural specimens here exhibited is an excellent collection of the sub-species and varieties of Indian corn, including the best of their kinds; a considerable collection of small grains and of grasses; a collection of fibers in various states of manufacture, and a series of analyses of grains showing at a glance the elements and proportion of structure. The museum contains full lines of illustrations of the work of the shops; models made at the University or purchased abroad ; drawings in all departments ; Patent Office models, etc., samples of building materials, natural and artificial; a large collection illustrating the forestry of Illinois, Florida, and California ; with whatever may be secured that will teach or illustrate in this most important phase of University work. The elegant exhibit made by the University at the Centennial and Cotton Exposition at New Orleans, finds a permanent abode in this apartment.

INDUSTRIAL MUSEUM

A notable feature of this collection is the gift of Henry Lord Gay, architect, of Chicago. It consists of a model in plaster, and a complete set of drawings of a competitive design for a monument to be erected in Rome, commemorative of Victor Emanuel, first king of Italy. The monument was to be of white marble, an elaborate gothic structure, beautifully ornamented, and 300 feet high. Its estimated cost was to have been seven and a quarter millions of francs. The design was placed by the art committee second on a list of 289 competitors. Mr. Gay's generous gift occupies the place of honor in the museum of industrial arts.

LIBRARY.

The library, selected with reference to the literary and scientific studies required in the several courses, had May 5, 1893, 25,519 volumes.

The large library hall fitted up as a reading-room, is open throughout the day for study, reading and consulting authorities. It is intended that the use of the library shall largely supplement the class room instruction in all departments. Constant reference is made in classes to works contained in the library, and their study is encouraged or required. The reading room is well provided with American, English, French and German papers and periodicals, embracing some of the most important publications in science and art.

The library of the State Laboratory of Natural History is rich in the world's best literature upon biological sciences, and affords advanced students excellent opportunities for work in this line.

The library of the Agricultural Experiment Station has 3,350 volumes and 1,900 pamphlets. This is also accessible to students.

LABORATORIES.

These essential facilities for modern educational work have been provided at the cost of large sums of money, and of much care to have them best suited for their various purposes. They are thoroughly well equipped.

The chemical laboratories occupy a building 75 by 120 feet, four stories high, including basement and mansard. The basement is used for storage, and for work in mining and metallurgy; the first floor has a lecture room, a laboratory for quantitative work for one hundred and fifty students, and several subsidiary rooms; the second floor, its laboratories for qualitative analysis, private work, lecture room, store room, etc.; and on the uppermost floor is the laboratory of the Agricultural Experiment Station, and apartments for photography.

Natural History Hall is occupied with the laboratories and lecture rooms for the work and instruction in botany, zoölogy, physiology, min-

eralogy, and geology; it also contains the office and equipments of the State Laboratory of Natural History, and of the State Entomologist, as well as the office and library of the Agricultural Experiment Station. There are six laboratory rooms on each of the main floors—sufficient altogether to accommodate two hundred students, besides offering abundant facilities for the private work of the instructors. The laboratory work in these departments constitutes a very large part of the instruction.

The physical laboratory and lecture room are in University Hall, occupying large, well lighted and well arranged apartments. Students have ample facilities for experimental work and opportunity to prosecute it under the guidance of the instructors.

The electrical laboratory, recently fitted up, is also in University Hall. It has five rooms, each especially adapted to its distinct purpose, and equipped for work in experiment and research. The laboratory has its own power from steam and gas engines.

The testing laboratory, located in Machinery Hall, gives opportunity to students of the College of Engineering to make various practical experiments and tests, and to prosecute original investigations in the lines of their specialties.

The mechanical laboratory occupies a large part of both floors of the Machinery Hall, and each of its departments is equipped for practical work by students. There is a large machine shop with hand and machine tools for all the required operations, a pattern shop, a blacksmith shop, a foundry, a boiler room, etc.

The architectural workshops, in the same building with the mechanical laboratory, are fully equipped for bench and lathe work, and are supplied with all essential machine tools. Students become familiar with the tools and the work of the carpenter and cabinet-maker, as well as with the draughting operations of the architect's office.

The laboratory for mining engineers, located in the Chemical Laboratory, is equipped upon a large scale for the work in ore dressing, assaying, metallurgy, and surveying. Students make use of machinery, furnaces and instruments as in practical work.

The farms, fruit and forestry plantations, and gardens offer abundant illustrations of the work associated with the courses of instruction in agriculture and horticulture. The varied and carefully conducted operations of the Agricultural Experiment Station afford excellent aids to students in these departments. For its specific purposes there are used about one hundred of the six hundred and ten acres comprised in the University farms and grounds.

# GENERAL LIST OF SUBJECTS.

This list gives all the subjects and the entire number of courses of instruction offered to students of the University. Fuller information will be found under these main headings appropriately distributed under the different colleges and schools, where they may be readily found by reference to the index. The arrangement here is alphabetical.

AGRICULTURE—

1. Farm Equipment. Fall term, full study.
2. Animal Husbandry. Winter term, full study.
3. Rural Economy. Winter term, full study.
4. History of Agriculture. Spring term, half study.
5. Rural Law. Spring term, half study.

ANTHROPOLOGY—

1. Origin and Progress of Man. Fall term, half study.

ARCHITECTURE—

1. Shop Practice B. Fall, winter, and spring terms, full study.
2. General Architectural Construction. Fall and winter terms, full study.
3. Sanitary Construction. Spring term, full study.
4. Architectural Drawing. Fall and winter terms, full study.
5. History of Architecture. Winter and spring terms, full study.
6. Roofs. Spring term, full study.
7. Architectural Perspective. Fall term, full study.
8. Superintendence, Estimates, and Specifications. Fall term, full study.
9. Advanced Graphics. Fall term, full study.
10. Heating and Ventilation. Winter term, full study.
11. Architectural Designing. Winter and spring terms, full study.
12. Esthetics of Architecture. Spring term, full study.

13. Architectural Course in Artistic Drawing and Modeling. For second year students. Fall, winter, and spring terms, full study.

14. Architectural Course in Artistic Drawing and Modeling. For fourth year students. Fall, winter, and spring terms, full study.

ART AND DESIGN—

1. For special students of Art and Design. Three years, double study.

2. For special students of Design. Three years, double study.

3. For students in Architecture. Two years, full study.

4. For students in Agriculture and Natural Science. Fall, winter, and spring terms, full study.

5. For students in Mechanical, Electrical, and Civil Engineering, and Chemistry. Fall and winter terms, full study.

6. For students in College of Literature. Three or six terms, full study.

7. History of Art. Winter term, one lecture a week.

BIOLOGY—

1. General Advanced Study. Spring term, full study.

BOTANY—

1. Histology, Morphology, and Physiology. Fall, winter, and spring terms, full study.

2. Bacteriology. Fall term, full study.

3. Systematic Botany. Winter term, full study.

4. Reproduction. Spring term, full study.

5. Investigations and Thesis. Winter and spring terms, full study.

6. General Botany. Spring term, full study.

CHEMISTRY—

1. General and Experimental Chemistry. Fall term, full study.

2. Inorganic Chemistry. Winter and spring terms, half study.

3. Qualitative Analysis. Winter term, full study.

4. Advanced Qualitative Analysis. Spring term, full study.

5 Quantitative Analysis. Fall term, full study.

6. Volumetric Analysis. Winter term, full study.

7. Agricultural Chemistry. Spring term, full study.

8. Technological Chemistry. Fall term, full study.

9. Organic Chemistry. Winter and spring terms, full study.

10. Sanitary Chemistry. Fall term, full study.

11. Investigation and Thesis. Winter and spring terms, full study.

12. Advanced Work for agricultural students. Fall, winter, and spring terms, full study.

13. Assaying. Winter term, full study.

14. Metallurgy. Spring term, full study.

15. Organic Analysis. Spring term, full study.

Arrangements may be made for special course of advanced work.

CIVIL ENGINEERING—

1. Land Surveying. Fall term, full study.

2. Topographical Drawing and Surveying. Winter and spring terms, half study.

3. Transit Surveying and Leveling. Winter and spring terms, half study.

4. Railroad Engineering. Fall term, full study.

5. Masonry Construction. Fall term, half study.

6. Geodesy. Fall term, half study.

7. Practical Astronomy. Fall term, half study.

8. (*a*) Bridge Analysis. (*b*) Bridge Designing. Winter and spring terms, full study.

9. Tunneling. Spring term, full study.

10. Surveying. Spring term, full study.

DESCRIPTIVE ASTRONOMY—

1. For students in Colleges of Agriculture, Science, and Literature. Spring term, full study.

2. For students in College of Engineering. Spring term, full study.

ELECTRICAL ENGINEERING—

1. Electrical Measurements. Spring term, full study.

2. Electrical Laboratory. Fall term, full study.

3. Electro-Magnetism and Dynamo-Electric Machinery. Winter term, full study.

4. Dynamo Laboratory. Winter term, full study.

5. Alternating Currents and Machines. Spring term, full study.

6. Installation of Light and Power Plants. Spring term, full study.

7. Photometry. Spring term, full study.

ENGLISH LITERATURE—

1. (*a*) English Literature. (*b*) Higher English Grammar. Fall winter, and spring terms, full study.

2. (*a*) Shakspere. (*b*) History of the Drama. (*c*) English Prose Fall, winter, and spring terms, full study.

3. (*a*) Poetry of the 19th Century. (*b*) Old and Early English. Fall, winter, and spring terms, full study.

4. (*a*) Prose of the 18th Century. Fall and winter terms. (*b*) Literary Study of History. Spring term. (*c*) Early English, continued. Fall term. (*d*) Chaucer's Canterbury Tales. Winter and spring terms. The whole, a full study.

5. For students in Colleges of Agriculture, Engineering, and Science. (*a*) General Survey of English Literature. Fall and winter terms. (*b*) Study of Scientific Prose. Spring term. (*c*) Higher English Grammar. Fall, winter, and spring terms. The whole, a full study.

ENTOMOLOGY—

1. General and Economic Entomology. Winter and spring terms, full study.

FRENCH—

1. For students in College of Literature. Fall, winter, and spring terms, full study.

2. For students in College of Literature. Fall, winter, and spring terms, full study.

3. For students in College of Literature. Fall, winter, and spring terms, full study.

4. For students in Colleges of Agriculture, Engineering, and Science. Fall, winter, and spring terms, full study.

GENERAL ENGINEERING DRAWING—

1. Elements of Draughting. Fall term, full study.

2. Descriptive Geometry. Half of winter term and the spring term.

3. Lettering. Half of winter term.

(Courses 2 and 3 count as a full study for both terms.)

GEOLOGY—

1. General and Economic Geology. For students in College of Science. Winter, spring, and fall terms, full study.

2. Special Advanced Work. Winter and spring terms, full study.

3. Engineering Geology. Winter term, full study.

4. General Geology. Spring term, full study.

GERMAN—

1. For students in College of Literature. Fall, winter, and spring terms, full study.

2. For students in College of Literature. Fall, winter, and spring terms, full study.

3. For students in College of Literature. Fall, winter, and spring terms, full study.

4. For students in Colleges of Agriculture, Engineering and Science. Fall, winter, and spring terms, full study.

GREEK—

1. Herodotus. Fall term, full study.
2. Xenophon's Hellenica. Winter term, full study.
3. Xenophon's Memorabilia. Spring term, full study.
4. Lysias and Demosthenes. Fall term, full study.
5. Plato's Apology and Selections from Phaedo. Winter term, full study.
6. Æschylus's Prometheus Bound and Euripides' Alcestis. Spring term, full study.
7. Seminary, Lyric Poetry. Fall term, full study.
8. Seminary, Thucydides. Winter term, full study.
9. Seminary, Homer. Spring term, full study.

HISTORY—

1. General History. Fall, winter, and spring terms, full study.
2. History of Civilization. Fall term, full study.
3. Constitutional History. Winter and spring terms, full study.
4. Constitutional History for students who have not had course 1. Winter term, full study.

HORTICULTURE—

1. Fruit Culture. Fall term, full study.
2. Forestry. Winter term, half study.
3. Plant Houses and House Plants. Winter term, half study.
4. Gardens. Spring term, full study.
5. Elements of Horticulture. Fall term, full study.

ITALIAN—

1. Course of one year. Fall, winter, and spring terms, full study.

LATIN—

1. Livy and Prose Composition. Fall term, full study.
2. Cicero de Amicitia. Winter term, full study.
3. Horace. Spring term, full study.
4. Tusculan Disputations. Fall term, full study.
5. Horace's Satires. Winter term, full study.
6. Tacitus and Roman Archæology. Spring term, full study.
7. Quintilian. Fall term, full study.
8. Juvenal's Satires. Winter term, full study.
9. Cicero de Officiis. Spring term, full study.

MATHEMATICS—

1. Advanced Algebra, for students in Colleges of Agriculture, Science, and Literature. Fall term, full study.

2. Advanced Algebra, for students in College of Engineering. Fall term, full study.

3. Trigonometry, for students in Colleges of Agriculture, Science, and Literature. Winter term, full study.

4. Trigonometry, for Students in College of Engineering. Winter term, full study.

5. Conic Sections. Spring term, full study.

6. Analytical Geometry. Spring term, full study.

7. Calculus and Analytical Geometry. Fall, winter, and spring terms, full study.

MECHANICAL ENGINEERING—

1. Shop Practice A. Fall, winter, and spring terms, full study.

2. Mechanical Drawing and Construction. Fall, winter, and spring terms, full study.

3. Mechanism. Fall term, full study.

4. (*a*) Engineering Materials. (*b*) Steam Engineering. (*c*) Valve Gears. Winter term, full study.

5. Mechanics of Machinery. Spring term, full study.

6. Heat Engines. Fall term, full study.

7. Machine Design. Fall and spring terms, full study.

8. Hydraulic Engines. Winter term, full study.

9. Laboratory Practice. Winter and spring terms, full study.

10. Estimates. Spring term, full study.

METEOROLOGY—

1. Atmospheric Conditions and Movements. Fall term, half study.

MILITARY SCIENCE—

1. Drill Regulations for Infantry. Fall and winter terms, 1 hour a week.

2. Drill Practice. Two years, 2 hours a week.

(Two credits for courses one and two together.)

3. For Officers of the Battalion. Six terms, 2 hours a week.

MINERALOGY—

1. General Course. Fall term, full study.

MINING ENGINEERING—

1. Mine Attack. Fall term, full study.

2. Mine Surveying. Spring term, full study.

3. Ore Dressing. Fall term, full study.
4. Mine Engineering. Winter and spring terms, full study.

MUNICIPAL AND SANITARY ENGINEERING—

1. Road Engineering. Winter term, full study.
2. Water Supply Engineering. Fall term, full study.
3. Sewerage. Winter term, full study.
4. Botany. Half of winter term, half study.
5. Bacteriology. Fall term, full study.

PEDAGOGY—

1. Educational Psychology. Fall term, full study.
2. School Hygiene. Winter term, full study.
3. Philosophy of Education. Spring term, full study.
4. History of Education. Fall term, half study.
5. School Supervision. Spring term, full study.
6. Pedagogical Seminary. Spring term, half study.

PHARMACY—

1. Beginners' Course. Fall, winter, and spring terms, full study.
2. Advanced Course. Fall, winter, and spring terms, full study.

PHILOSOPHY—

1. Psychology. Fall term, full study.
2. Logic. Winter term, full study.
3. History of Philosophy. Spring term, full study.
4. Ethics. Winter term, full study.
5. Experimental Psychology. Winter term, full study.

PHYSICS—

1. Major Course. Fall, winter, and spring terms, full study.
2. Minor Course. Winter term, full study.

PHYSIOLOGY—

1. Human Physiology. Fall term, full study.

POLITICAL ECONOMY—

1. Political Economy. Spring term, full study.

RHETORIC AND ORATORY—

1. Themes and Elocution, for students in Colleges of Agriculture, Engineering and Science. Fall, winter, and spring terms, 3 hours a week. (Two credits.)

2. Themes and Elocution, for Students in College of Literature. First year, 2 hours a week; fourth year, 1 hour a week. (Two credits.)

3. Elocution and Oratory. Elective course. Fall, winter, and spring terms, 2 hours a week. (One credit.)

SPANISH—

1. Course of one year. Fall, winter, and spring terms, full study.

THEORETICAL AND APPLIED MECHANICS—

1. Analytical Mechanics. Fall term, full study.
2. Resistance of Materials. Winter term, full study.
3. Hydraulics. Spring term, full study.

VETERINARY SCIENCE—

1. Anatomy and Physiology. Fall term, full study.
2. Principles and Practice of Veterinary Medicine. Winter and spring terms, full study.
3. Materia Medica. Fall, winter, and spring terms, full study.

ZOÖLOGY—

1. General Zoölogy, for students in College of Science. Fall, winter, and spring terms, full study.
2. Embryology. Fall term, full study.
3. Investigation and Thesis. Winter and spring terms, full study.
4. Systematic Zoölogy (including Entomology). Fall, winter, and spring terms, full study.
5. General Zoölogy, minor course. Winter term, full study.

# ORGANIZATION.

I. The College of Agriculture:
Course in Agriculture.
Course in Veterinary Science.
Course in Horticulture.
Junior Course in Agriculture.

II. The College of Engineering:
Course in Mechanical Engineering.
Course in Electrical Engineering
Course in Civil Engineering.
Course in Municipal and Sanitary Engineering.
Course in Mining Engineering
Course in Architecture.
Course in Architectural Engineering.

III. The College of Science:
School of Chemistry.
School of Natural Science.

IV. The College of Literature:
School of English and Modern Languages.
School of Ancient Languages.
School of Philosophy and Pedagogy.

Additional Schools not distinctly attached to any of the Colleges:
School of Military Science.
School of Art and Design.

V. Graduate School.

*Vocal and Instrumental Music* are also taught, but not as parts of any regular course.

*Preparatory Classes.*—To meet an urgent demand, the Trustees have temporarily provided for teaching the preparatory studies lying between the work of the elementary common schools and that of the University.

# COLLEGE OF AGRICULTURE.

## COURSES.

AGRICULTURE; VETERINARY SCIENCE; HORTICULTURE; JUNIOR COURSE IN AGRICULTURE.

## FACULTY.

THOMAS J. BURRILL, PH.D., ACTING REGENT, Botany and Horticulture.
GEORGE E. MORROW, M.A., *Dean*, Agriculture.
STEPHEN A. FORBES, PH.D., Zoölogy and Entomology.
CHARLES W. ROLFE, M.S., Geology.
DONALD MCINTOSH, V.S., Veterinary Science.
ARTHUR W. PALMER, SC.D., Chemistry.
SAMUEL W. PARR, M.S., Analytical Chemistry.
FRANK D. GARDNER, B.S., Agriculture.

## MEMBERS OF OTHER FACULTIES GIVING INSTRUCTION IN THIS COLLEGE.

EDWARD SNYDER, M.A., German.
JAMES D. CRAWFORD, M.A., History.
JAMES H. BROWNLEE, M.A., Rhetoric and Oratory.
FRANK F. FREDERICK, Industrial Art and Design.
ELBRIDGE R. HILLS, Captain U.S.A., Military Science.
M. R. PARADIS, M.A., French.
DANIEL K. DODGE, PH.D., English Language and Literature.
GEORGE W. MYERS, M.L., Mathematics.
DANIEL W. SHEA, PH.D., Physics.
GEORGE W. PARKER, Wood Work.
HOWARD S. BRODE, Zoölogy.

# COLLEGE OF AGRICULTURE.

The College of Agriculture aims to give a liberal and practical education, based largely on the natural and physical sciences, but supplementing these with technical or professional studies in which the

application of science to the best modern practice of agriculture is carefully considered. The purpose is to prepare its students to be intelligent and successful farmers or horticulturists; teachers of agriculture in schools or colleges, or through the agricultural press, or to be investigators in the agricultural experiment stations of the country. It also gives a good foundation in the study of veterinary science.

Shorter courses are provided for those who already have a good scientific education, and for those who desire to pursue the technical studies with special reference to their practical applications.

This college has the advantage of a close connection with the other colleges of the University, especially with the College of Science. The libraries, laboratories, museums, and collections of the University are a part of its equipment.

### Methods of Instruction.

So far as is practicable, the professional studies are taught after a study of the sciences with which agriculture is most closely related. They are taught mainly by lectures, with use of text-books where suitable ones are available. Readings are prescribed in standard agricultural books and periodicals. Large use is made of the publications of agricultural experiment stations. Frequent written or oral discussions of the principles taught are required of the student. Principles are also illustrated by observations in the fields, stables, orchards, gardens, etc., of the University, or in the vicinity.

The constant aim is to aid the student in forming habits of careful and accurate observation and investigation; to lead him to seek the reasons for agricultural methods, as well as to learn rules of practice; to teach him how to use the sources of knowledge concerning agriculture; and to help him to become an intelligent, progressive citizen and business man.

### Equipment.

The College has for the illustration of practical agriculture, a stock farm of 400 acres, provided with a large stock barn fitted up with stables, pens, yards, etc.; also an experiment farm of 180 acres, furnished with all necessary apparatus to illustrate the problems of breeding and feeding. It has specimens of heavy draft, farm and roadster horses, and of Shorthorn, Hereford, Holstein and Jersey cattle, and of Poland-China swine.

EXPERIMENT STATION LABORATORY



FARM BARN



COTTON FIELD



AFRICAN VILLAGE AND NATIVES

The Agricultural Experiment Station, established as a department of the University, exhibits field experiments in testing the different varieties and modes of culture of field crops, and in the comparison and treatment of soils. It carries on experiments in agriculture, horticulture, dairying and in feeding animals of different ages and development upon the various kinds of food. In common with similar departments in the several agricultural colleges of the country, it attempts to create positive knowledge towards the development of an agricultural science. A dairy house, fitted with a cream separator, apparatus for deep and shallow setting of milk, churns, etc., is used in illustration of dairy processes.

Surveying and drainage are illustrated by field practice, with instruments, and by models. Agricultural chemistry is pursued, in connection with laboratory practice, in the analysis of soils, fertilizers, foods, etc. The College has fine collections of soils, seeds, plants, implements, models, and skeletons of domestic animals, charts, and other apparatus, including a large number of models of agricultural machinery.

Upon the grounds devoted to the use of the college are: An apple orchard, containing numerous varieties, planted in 1869; also many varieties of pears, cherries, grapes, and small fruits; a forest tree plantation, embracing the most useful kinds of timber; an arboretum, in which all hardy, indigenous, and exotic trees are planted as fast as they can be secured, and which now contains nearly one hundred varieties.

The ornamental grounds which surround the University buildings contain about twenty acres, and are kept in neat and attractive style. These, with all the adjuncts of trees and flowering shrubs, lawns, beds of flowers and foliage plants, walks of different materials and styles of laying out, give illustration to the class room work in landscape gardening. A greenhouse contains a collection of plants of great value for the classes in floriculture and landscape gardening, besides furnishing students with practice in greenhouse management.

The extensive fruit plantations of the Agricultural Experiment Station give abundant opportunity for studies and illustrations in many horticultural lines, and add greatly to the effectiveness of class room work.

The cabinet contains a series of colored plaster casts of fruits prepared at the University; models of fruits and flowers by Auzoux, of Paris; collections of seeds of native and exotic plants, of specimens of native and foreign woods, of beneficial and injurious insects, and of specimens showing their work; numerous dry and alcoholic specimens and preparations; maps, charts, diagrams, drawings, etc.

The College has a supply of compound microscopes and apparatus, and students have opportunity to learn their use, and to make practical

investigations with them. The herbarium is rich in specimens of useful and noxious plants, including many of the fungous parasites which cause disease to cultivated crops.

## COURSES OF INSTRUCTION.

### AGRICULTURE.

1. Farm Equipment.—Careful consideration is given to the planning and methods of construction of farm buildings; to the division of the farm into fields; to a comparison of different methods of fencing, with methods of construction and care of each; to laying out, constructing, and maintaining roads. Especial attention is given to the improvement of the farm by drainage; the reasons for drainage, laying out drains, methods of leveling, estimating size of tile, and depth of drains best adapted for different situations being fully explained. Field practice accompanies the class room work. The selection, use, and care of farm implements and machinery receive full consideration. *Lectures and Reference Reading. Fall term, full study.* Professor MORROW.

2. Animal Husbandry.—The leading principles of breeding and the practical methods of feeding and managing farm animals, horses, cattle, sheep, and swine, are discussed. The purpose served by food, and the best methods of feeding for the economical production of meat, dairy products, wool, etc., are explained with free use of the records of practice by successful breeders and feeders in this and other countries. The history, characteristics, and adaptations of all important breeds of farm animals are studied. Students are given the opportunity of carefully studying animals and judging them with reference to breed characteristics and their adaptations to different uses. Practice is given in study of pedigrees. *Lectures and Reference Reading. Winter term, full study.* Professor MORROW.

3. Rural Economy.—The relation of agriculture to other industries; the advantages and disadvantages of different systems, as stock rearing, dairying, grain farming; of specialties and general farming, and the circumstances which make each desirable, are discussed. The culture of farm crops, cereals, roots, grasses, etc., including choice of varieties, preparation and cultivation of the soil, harvesting and utilization of each, receives as full attention as time permits. *Lectures and Reference Reading. Winter term, full study.* Professor MORROW.

4. History of Agriculture.—The development of agriculture, especially in comparatively recent times and in our own country, is studied with particular reference to the effects of climate, different phases of civilization and of legislation in advancing or retarding it. The history and characteristics of agricultural organizations of various classes are considered, and a survey is taken of agricultural literature. *Lectures and Reference Reading. Spring term, half study.* Professor MORROW.

5. Rural Law.—The object of this study is to enable the student to familiarize himself with some fundamental principles of law and with the special laws which most directly affect the farmer. Tenure of real estate; laws relating to roads, fences, drainage, etc., as well as the most important parts of commercial law are considered. *Lectures and Reference Reading. Spring term, half study.* Professor MORROW.

## VETERINARY SCIENCE.

1. Anatomy and Physiology.—The anatomy and physiology of the domestic animals constitute the subjects of instruction for a term. The instruction is given by lectures, aided by demonstrations with use of skeletons and models illustrating the details of structure and formation of parts. This is supplemented by the study of text-books. *Strangeway's Veterinary Anatomy; Smith's Physiology of the Domestic Animals. Fall term, full study.* Professor MCINTOSH.

2. Principles and Practice of Veterinary Medicine.—This subject comprises veterinary medicine, surgery, and hygiene, and is taught by lectures and text books, and illustrated by specimens of morbid anatomy, with observations and practice at the clinics. The latter are held at the veterinary infirmary, where a large number of animals are treated or operated upon once each week. Dissections and post mortems are made. *Williams's Practice of Veterinary Medicine and Surgery; Courtney's Practice of Veterinary Medicine and Surgery. Winter and Spring terms, full study.* Professor MCINTOSH.

Materia Medica.—The substances and agents used for the prevention or cure of disease and for the preservation of health are studied in this course. The instruction is given by lectures and text-books. In the illustrative collections are specimens of all the drugs used. *Dun's Veterinary Materia Medica; Wood's Human Materia Medica. Fall, winter, and spring terms, full study.* Professor MCINTOSH.

## Horticulture.

1. Fruit Culture.—Orchards, vineyards, small fruit plantations and their products constitute the main subjects of this term's work. Lectures are given upon propagating, planting, and cultivating trees and vines; upon identifying, classifying, and preserving fruits, and upon diseases and remedies. Studies are made upon illustrative material in the laboratory, and visits to the orchards and plantations form a part of the instruction. *Fall term, full study.* Professor Burrill.

2. Forestry.—This course embraces a study of forest trees and their uses, their natural distribution, and their artificial production. The relations of forests and climate are studied, and the general topics of forestry legislation and economy are discussed. *Lectures. Winter term, half study.* Professor Burrill.

3. Plant Houses and House Plants.—This study includes gardening and landscape architecture; the methods of construction, heating and ventilation, and general management of greenhouses, and the study of the kinds, propagation, growth, and care of flowering plants. Each student has practice in propagating by cuttings and otherwise, in potting and shifting, and in care of plants requiring various treatment. Insects and diseases, with remedies, are treated and the means of securing vigor of growth and abundance of flowers are studied and illustrated by practice. *Henderson's Practical Floriculture. Winter term, half study.* Professor Burrill.

4. Gardens.—Kitchen and market gardens are made the first subjects of study, after which ornamental and landscape gardening occupies the time. *Henderson's Gardening for Profit; Long's Ornamental Gardening. Spring term, full study.* Professor Burrill.

5. Elements of Horticulture.—This is a minor course, intended for students who take but one term of horticultural work. The following topics are discussed: Orchard sites; the age of trees to plant; the season to plant; how to plant; what to plant; the management of the soil; pruning and care of trees; gathering and preserving fruit; diseases and injuries; the nursery; ornamental trees and shrubs; flower gardens; vegetable gardens, including propagating beds and houses; the vineyard and small fruits, and timber tree plantation. Students have instruction and practice in grafting, budding, propagation by cuttings, etc. *Lectures. Fall term, full study.* Professor Burrill.

The following subjects, offered to students in the College of Agriculture, are described elsewhere, as noted.

In College of Engineering—

Mathematics, 1, 3, 5; Physics, 1, or 2; Shop Practice, B.

In College of Science—

Chemistry, 1–4, 12; Botany, 1, 2, 3, 4 or 6; Zoölogy, 1, or 5; Entomology, 1; Physiology, 1; Mineralogy, 1; Geology, 1, or 5; General Biology, 1.

In College of Literature—

History, 3; Political Economy, 1; Philosophy, 1; Pedagogy, 2, or 5, or 2 and 3, or 5 and 6; Themes and Elocution, 1; English Language and Literature, 5; German, 1 and 2, or 4; French, 1 and 2, or 4.

In School of Military Science—

Military Science, 1, 2.

## CLASSIFICATION OF STUDIES.

For the degree of Bachelor of Science in the College of Agriculture 40 credits are required, each given for the satisfactory completion of the study of a required or elective subject for one term, five exercises a week. Of these credits 23 must be obtained by pursuing the required studies each for the minimum time named below. The other 17 credits may be obtained by pursuing further required studies, or by the prosecution of elective studies.

Students who have completed a four years' course of study in the College of Science may take the professional agricultural studies in one year; and those who have followed a course for two years may take the professional studies, and other scientific or general studies in the last two years of their course.

Students especially interested in animal husbandry or veterinary science may omit some of the horticultural studies; and those preparing for horticultural work may omit veterinary specialties.

### REQUIRED STUDIES.

Agriculture—3 to 4 credits.
Horticulture—1 to 3 credits.
Veterinary Science—1 to 4 credits.
Botany—1 to 6 credits.
Chemistry—3 to 9 credits.
Physics—1 to 3 credits.
Mathematics—2 to 3 credits.
French—3 or 6 credits.
German—3 or 6 credits.
Political Economy—1 credit.
Themes and Elocution—2 credits.
Military—2 credits.

ELECTIVE STUDIES.

Bacteriology—1 credit.
Entomology—2 credits.
General Biology—1 credit.
Geology—2 credits.
Mineralogy—1 credit.
Physiology—1 credit.
Zoölogy—3 credits.
Meteorology—½ credit.
Anthropology—½ credit.
Psychology—1 credit.
Pedagogy—2 credits.
Drawing—3 credits.
English Language and Literature—3 credits.
French—3 credits.
German—3 credits.
Constitutional History—1 credit.
Shop Practice—1 credit.

## Suggested Courses of Study in Agriculture.

For the guidance of students in the selection of studies the following courses are offered. The first year's work, at least, should be taken as laid down in one of these courses, after which free selection may be made within the limits of the prescribed lists of required and elective subjects. Close correspondence exists for the first two years between these courses and those of the College of Science. The special professional subjects occur in the third and fourth years, or in the fourth alone.

Course 1 is arranged with nearly equal amounts of time given to each of the sciences, and is adapted to students who do not wish to specialize in any one of these subjects. Courses 2 and 3 may be chosen by those who desire to give more attention to chemistry; course 4 by those who wish to make botanical studies a specialty; and course 5 by those who take a year's work in horticulture.

### Course one.

FIRST YEAR.

1. Chemistry; Advanced Algebra; Physiology; Military.
2. Chemistry; Trigonometry; Drawing; Military.
3. Chemistry; Astronomy, or Mathematics; Drawing; Military.

SECOND YEAR.

1. Botany; Physics; French; Military.
2. Botany; Physics; French; Military.
3. Botany; Physics; French; Military.

THIRD YEAR.

1. Zoölogy; Mineralogy; German; Themes and Elocution.
2. Entomology; Geology; German; Themes and Elocution.
3. Entomology; Geology; German; Themes and Elocution.

FOURTH YEAR.

1. Farm Equipment; Fruit Culture; Psychology.
2. Rural Economy; Veterinary Science; Animal Husbandry.
3. History of Agriculture and Rural Law; Veterinary Science; Political Economy.

COURSE TWO.

FIRST YEAR.

1. Chemistry; Advanced Algebra; French; Military.
2. Chemistry; Trigonometry; French; Military.
3. Chemistry; Astronomy, or Mathematics; French; Military.

SECOND YEAR.

1. Chemistry; Physiology; German; Military.
2. Chemistry; Zoölogy; German; Military.
3. Chemistry; Botany; German; Military.

THIRD YEAR.

1. Physics; German; Veterinary Science; Themes and Elocution.
2. Physics; German; Veterinary Science; Themes and Elocution.
3. Physics; Geology; Veterinary Science; Themes and Elocution.

FOURTH YEAR.

1. Farm Equipment; Psychology; Horticulture; Thesis.
2. Rural Economy; Animal Husbandry; Constitutional History.
3. History of Agriculture and Rural Law; Vegetable Physiology; Political Economy.

COURSE THREE.

FIRST YEAR.

1. Chemistry; Advanced Algebra; French; Military.
2. Chemistry; Trigonometry; French; Military.
3. Chemistry; Astronomy, or Mathematics; French; Military.

SECOND YEAR.

1. Chemistry; Physics; German; Military.
2. Chemistry; Physics; German; Military.
3. Chemistry; Physics; German; Military.

THIRD YEAR.

1. Chemistry; Botany; Physiology; Themes and Elocution.
2. Chemistry; Botany; Zoölogy; Themes and Elocution.
3. Chemistry; Botany; Geology; Themes and Elocution.

FOURTH YEAR.

1. Farm Equipment; Horticulture; Psychology; Thesis.
2. Rural Economy; Veterinary Science; Animal Husbandry.
3. History of Agriculture and Rural Law; Veterinary Science; Political Economy.

COURSE FOUR.

FIRST YEAR.

1. Chemistry; Advanced Algebra; French; Military.
2. Chemistry; Trigonometry; French; Military.
3. Chemistry; Astronomy, or Mathematics; French; Military.

SECOND YEAR.

1. Botany; Physics; German; Military.
2. Botany; Physics; German; Military.
3. Botany; Physics; German; Military.

THIRD YEAR.

1. Bacteriology; Zoölogy; Veterinary Science; Themes and Elocution.
2. Systematic Botany; Zoölogy; Veterinary Science; Themes and Elocution.
3. Plant Reproduction; Zoölogy; Veterinary Science; Themes and Elocution.

FOURTH YEAR.

1. Farm Equipment; Horticulture; Psychology; Thesis.
2. Rural Economy; Entomology; Animal Husbandry.
3. History of Agriculture and Rural Law; Entomology; Political Economy.

COURSE FIVE.

FIRST YEAR.

1. Chemistry; Advanced Algebra; French; Military.
2. Chemistry; Trigonometry; French; Military.
3. Chemistry; Astronomy, or Mathematics; French; Military.

SECOND YEAR.

1. Botany; Physics; German; Military.
2. Botany; Physics; German; Military.
3. Botany; Physics; German; Military.

THIRD YEAR.

1. Bacteriology; Zoölogy; Physiology; Themes and Elocution.
2. Systematic Botany; Zoölogy; Entomology; Themes and Elocution.
3. Plant Reproduction; Zoölogy; Entomology; Themes and Elocution.

FOURTH YEAR.

1 Fruit Culture; Farm Equipment; Psychology.
2. Forestry; Plant Houses; Rural Economy; Constitutional History.
3. Gardens; History of Agriculture and Rural Law; Political Economy.

## JUNIOR COURSE IN AGRICULTURE.

A two years' course has been arranged for those who desire some knowledge of the physical and natural sciences as well as the professional

agricultural studies. For admission to this course students should not be less than eighteen years of age, and if under twenty-one years must pass the examinations in the common branches as required for entrance to the preparatory department, and in elementary botany.

Students of sufficient age and attainments may take the professional studies of this course in one year. Horticultural studies may be substituted for veterinary science if desired.

The two years' course is arranged as follows:

### Junior Course in Agriculture.

#### FIRST YEAR.

1. Chemistry; Natural Philosophy; Physiology.
2. Chemistry; Zoölogy; English, or Free Hand Drawing.
3. Chemistry; Botany; English, or Free Hand Drawing.

#### SECOND YEAR.

1. Farm Equipment; Horticulture; Bacteriology.
2. Animal Husbandry; Veterinary Science; Rural Economy, or Entomology.
3. History of Agriculture, and Rural Law; Veterinary Science; Vegetable Physiology, or Entomology.

### Free Short Course.

For the winter term, students are admitted without entrance examination or payment of any fee to a special short course in which there are daily lectures and class exercises concerning some of the most important practical branches of agriculture, horticulture, and veterinary science. This course is designed for young men already engaged in agricultural pursuits who cannot spend a long time in college, and yet are anxious to make the most of themselves and of their vocation. Such students have access to the library and museum collections of the University, and have admission to the courses of general lectures.

The details of this course vary from year to year. A special circular giving full information concerning it will be issued each year several weeks before the opening of the term the first of January.

# COLLEGE OF ENGINEERING.

## COURSES.

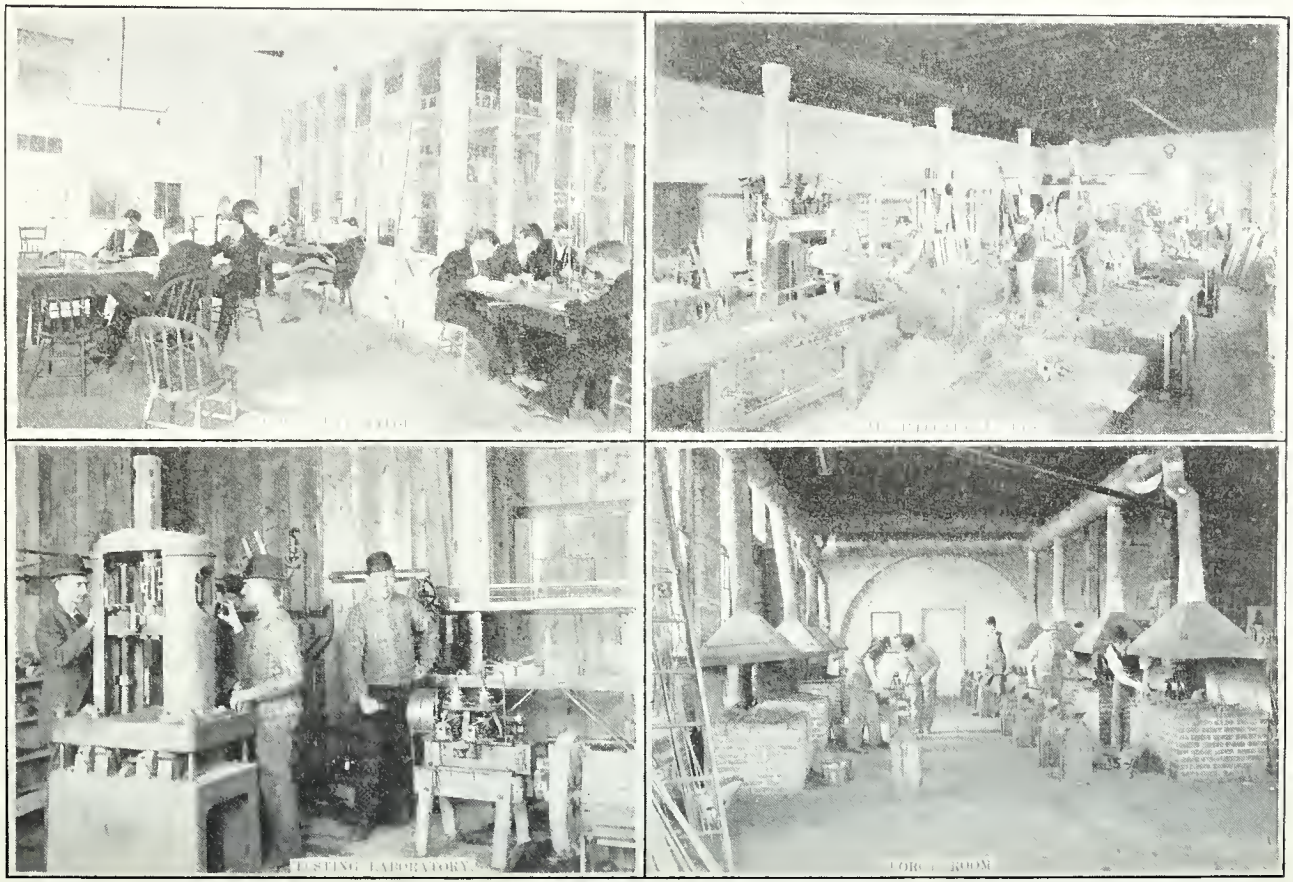
MECHANICAL ENGINEERING; ELECTRICAL ENGINEERING; CIVIL ENGINEERING; MUNICIPAL AND SANITARY ENGINEERING; MINING ENGINEERING; ARCHITECTURE; ARCHITECTURAL ENGINEERING.

## FACULTY.

THOMAS J. BURRILL, PH.D., ACTING REGENT, Botany.
N. CLIFFORD RICKER, M.Arch., *Dean*, Architecture.
SAMUEL W. SHATTUCK, C.E., Mathematics.
IRA O. BAKER, C.E., Civil Engineering.
ARTHUR N. TALBOT, C.E., Municipal Engineering and Mechanics.
FRANK F. FREDERICK, Industrial Art and Design.
WALTER J. BALDWIN, B.S., Mining Engineering.
CHARLES W. SCRIBNER, M.E., Mechanical Engineering.
GEORGE W. MYERS, M.L., Mathematics.
DANIEL W. SHEA, PH.D., Electrical Engineering and Physics.
GEORGE W. PARKER, Wood Work.
RUFUS ANDERSON, M.E., Iron Work.
JAMES M. WHITE, B.S., Architecture.
CYRUS D. MCLANE, B.S., General Engineering Drawing.
ALBERT L. KUEHMSTED, M.E., Electrical Engineering.
JAMES D. PHILLIPS, Mechanical Engineering Drawing.

## MEMBERS OF OTHER FACULTIES GIVING INSTRUCTION IN THIS COLLEGE.

EDWARD SNYDER, M.A , German.
JAMES D. CRAWFORD, M.A., History.
JAMES H. BROWNLEE, M.A., Rhetoric and Oratory.
CHARLES W. ROLFE, M.S., Geology.
ARTHUR W. PALMER, SC.D., Chemistry.
ELBRIDGE R. HILLS, Captain U.S.A., Military Science.
SAMUEL W. PARR, M.S., Chemistry.
M. R. PARADIS, M.A., French.
DANIEL K. DODGE, PH.D., English Language and Literature.



# COLLEGE OF ENGINEERING.

The purpose of the College of Engineering is thoroughly to educate and prepare engineers and architects for their future professional courses. Its aim must therefore be twofold—general and technical. A considerable proportion of the course of study must be devoted to general and literary work, since a graduate is expected now to arrange his ideas in clear order, and to write or speak effectively, whenever it becomes necessary. Professional success frequently depends upon this power far more than is commonly supposed.

Moreover there is an ever-increasing fund of general and scientific knowledge with which any educated man is expected to be conversant, if he desires to retain the esteem of his associates and clients. Much of the most valuable material is yet locked up in foreign languages, and their keys must be acquired by patient study and practice. Scarcely a single science is not at some time useful to the professional man, and some of them, like mathematics or physics, are so intimately interwoven with the different branches of technical knowledge, as to be practically indispensable, and so require a more thorough mastery than is necessary to the literary man. It might appear that this general training would alone be sufficient to absorb the entire attention of the student during his whole course, but not less than one-half his time must be given to purely technical training, and the acquiring of a professional capital, or stock of information and knowledge of details, which is almost limitless in its demands and possibilities.

The methods employed for embodying new ideas in drawings, intelligible to other professional men and to mechanics, must likewise be acquired.

A knowledge of the latest results of scientific experiments is likewise essential, requiring wide reading by some one, either student or professor. Engineering knowledge must be fresh to be valuable, since ideas and methods are quickly supplanted by improved oues, and become useless except as mile-stones of progress. Consequently the most valuable part of this professional knowledge can never be crystallized in text-books, but must be drawn from the mental stores of the teacher.

## General Methods of Instruction.

Whenever suitable text-books can be found they are employed, because saving much time in acquiring facts and data, and because such books become doubly valuable for later reference when enriched by notes and additions. But to arouse and awaken the enthusiasm of the

student, occasional or stated lectures are necessary, and these are fully illustrated by sketches, diagrams, drawings, and photographs of executed work. They are frequently used in the advanced classes, partly because the deficiency of text-books is there most apparent. Additional courses of extended reading are marked out by references to the University library, so that each student may enjoy the greatest possible benefit from the course of instruction. In all courses of study offered by the College, drawing in its manifold forms and uses is made of especial importance both in its use and its modes of execution.

### Testing Laboratory.

The testing laboratory has a Riehle testing machine of 100,000 pounds capacity, a smaller apparatus for testing beams, a Riehle cement testing machine, a stone grinding machine, a rattler for abrasion tests of stone and brick, with apparatus for making all necessary measurements and observations, molds, and standard sieves for cement, etc. The laboratory is fitted up as a working laboratory where students may acquire such practice in experimental work as engineers are called upon to perform, as well for the purpose of illustrating principles as for use in original investigation. The ordinary work includes testing metals, wooden beams, cement briquettes, and stone and brick.

The hydraulic laboratory includes elevated tank and stand-pipe, steam pumps for giving high pressure, tanks for measuring flow of water, pressure gauges, meters, water motor, turbine, and other apparatus for experiments with orifices, weirs, etc. The experiments are made in connection with the regular class instruction.

### Computing Apparatus.

A collection of machines and apparatus for abbreviating computations and especially for use in the calculation of tables, includes the following instruments:

A Thomas's 10-place arithmometer, giving products of numbers to 20 places. This is the largest size manufactured and was imported especially for the University. It is probably as convenient and accurate as any computing machine yet invented. It performs addition, subtraction, multiplication, and division, and is particularly useful in calculating or verifying numerical tables. Two Thacher's computing scales, for performing multiplication, division, squaring, and extraction of square root. This instrument is sufficiently accurate for almost all purposes, and can be used more rapidly than the former. An Amsler's polar planimeter for

measuring the area of figures of any form, and principally employed in graphic statics, or by mechanical engineers for measuring indicator diagrams. An Amsler's rolling planimeter of largest size, for the same uses as the ordinary planimeter, but producing only one-sixth the error. An Amsler's integrator, which is chiefly employed for obtaining the numerical value of the moment of inertia of any plane figure, especially sections of columns and girders. A Webb's adder for performing addition only.

## COURSES OF INSTRUCTION.

### Mathematics.

The instruction offered in pure mathematics constitutes two distinct lines of study differing in extent, partially in subject matter, and in the method of presentation. The first is for students in the Colleges of Agriculture, Science, and Literature, and occupies one year, beginning in the fall. It has for its object to promote habits of mental concentration and continuity of thought, to develop the capacity to form and combine abstract conceptions and to cultivate deductive reasoning. The second is primarily offered to students in the College of Engineering and occupies two years, also beginning in the fall. In addition to the educational object just given, the purpose is to enable the student to meet the requirements of his engineering studies. The greater part of the time is necessarily taken up with the theory and its applications to geometrical magnitudes.

The first line of study includes the courses numbered 1, 3, and 5; the second, courses 2, 4, 6, and 7.

1. Advanced Algebra.—For students in the Colleges of Agriculture, Science, and Literature. Functions and their notation; series and the theories of limits; imaginary quantities; general theory of equations. Topical reviews of all preceding algebraic processes. *Wells's University Algebra. Fall term, full study.* Assistant Professor Myers.

2. Advanced Algebra.—For students in the College of Engineering. Principles of small practical value are subordinated to those of higher utility. Accuracy and dispatch in the use of principles are continually emphasized. A topical review of principles of elementary algebra is made from time to time. This review is sometimes made by requiring students to solve practical problems illustrative of principles not well understood. Some of the most important

subjects in which instruction is given are functions and their notation; the progressions; theory of numbers; permutations and combinations; probabilities; convergency and divergency of series; summation of series; undetermined coefficients; doctrine of limits; logarithms and general theory of equations. *Newcomb's College Algebra. Fall term, full study.* Assistant Professor MYERS.

3. Trigonometry.—For students in the Colleges of Agriculture, Science, and Literature. Trigonometry, plane and spherical; fundamental relations between the trigonometrical functions of an angle or arc; relations between the functions of different angles or arcs; construction and use of tables; solution of triangles; angles as functions of sides, and sides as functions of angles; applications. *Wells's Essentials of Trigonometry. Winter term, full study.* Assistant Professor MYERS.

   *Required:* Math., 1.

4. Trigonometry.—For students in College of Engineering. The ratio system is studied chiefly, but the necessary connection between it and the line system is carefully proved and illustrated. Students are frequently required to demonstrate the same proposition, using first the line values, then the ratio values of the functions. The subjects taught are the circular measurement of angles, general formulæ of plane and spherical trigonometry, relations between functions of multiples of 90° plus or minus an angle, solution of right and oblique plane triangles, of spherical right and oblique triangles, Napier's rules and analogies, and practical applications of principles to the solutions of astronomical problems. Teaching is in part by text book, and in part by assigning principles to be demonstrated and problems to be solved outside of the text book. *Wells's Essentials of Trigonometry. Winter term, full study.* Assistant Professor MYERS.

   *Required:* Math., 2.

5. Conic Sections (geometrical method).—Definitions and general properties of the ellipse, hyperbola, and parabola; curvature of the conic sections; elements of analytical geometry. Properties and relations of the point and right line in a plane of the conic sections. *Coffin's Sections and Analytical Geometry. Spring term, full study.* Assistant Professor MYERS.

   *Required:* Math., 1, 3.

6. Analytical Geometry.—The aim is to acquaint the student with analytical methods of investigation, and to familiarize him with some of

the most recent developments in synthetic geometry; to make him more skillful in the use of algebraic processes, especially as a means of demonstrating geometric properties of loci. Subjects considered are the elementary theory of the point and right line in a plane; use of abbreviated notation; elementary theory of the conic sections, their equations and properties developed analytically; poles and polars; synthetic geometry of the circle, and the discussion of the general equation of the second degree. Written work in plotting and discussing loci from their equations is required from time to time. *Newcomb's Analytic Geometry. Spring term, full study.* Assistant Professor MYERS.

*Required:* Math., 2, 4.

7. Differential Calculus.—Rules for the differentiation of functions of a single variable; successive differentiation; development of functions; maxima and minima of functions of a single variable; differentials of an arc, plane area, surface and volume of revolution; elementary discussion of higher plane curves; the spirals, logarithmic curve, trochoid, etc.; algebraic curves.

Integral Calculus. Integration of elementary forms and rational functions; rectification of plane curves; quadrature of plane areas and surfaces of revolution; cubature of solids of revolution.

Advanced Analytical Geometry. Loci in space; in point, right line, plane and surfaces of the second order.

Advanced Calculus. Development of the second state of functions of any number of variables; differential equations; maxima and minima of functions of two or more variables; construction and discussion of curves and surfaces; integration of irrational and transcendental differentials and of differential equations of the higher orders and degree; applications; elements of elliptic integrals. *Byerly's Differential Calculus; Byerly's Integral Calculus; Newcomb's Analytic Geometry. Fall, winter, and spring terms, full study.* Professor SHATTUCK.

*Required:* Math., 2, 4, 6.

### THEORETICAL AND APPLIED MECHANICS.

1. Analytical Mechanics.—The mechanics of engineering rather than that of astronomy and physics is here considered, with a view to the future needs of the student of engineering. In addition to fixing the fundamental concepts and demonstrating the general principles of equilibrium and motion, application of principles and methods is

made to numerous and varied engineering problems in such a way that the student must discriminate in the use of data and in the statement of conditions, and so obtain a working knowledge of the subject. The methods of the calculus are used whenever preferable. As mathematical processes and forms express most readily and quickly the rules and methods of work, the training in this direction is important. This subject requires a thorough working knowledge of the mathematics preceding it in the course.

Outline of the subject: Nature and measure of force; composition and resolution of forces; moments; conditions of equilibrium; resultant of systems; of forces; center of gravity; moment of inertia; rectilinear and curvilinear motion, and the relation between such motion and the constraining and accelerating forces; dynamics of a rigid body; momentum and impact; work, energy, and power; mechanical advantage; friction. *Bowser's Analytical Mechanics. Fall term, full study.* Professor TALBOT.

*Required:* Math., 2, 4, 5, 6, 7.

2. Resistance of Materials.—In the treatment of this subject it is the aim to give the student a thorough training in the elementary principles of the mechanics of materials, to follow with such experiments and investigations in the testing laboratory as tend to verify the experimental laws, and to add such problems in ordinary engineering practice as will train the student in the use of his knowledge.

Outline of the subject: Elasticity of materials; stresses and strains; experimental laws; working strength for different materials; resistance of pipes and riveted joints; bending and resisting moment, shear and elastic curve of cantilever, simple, restrained, and continuous beams; column formulas; torsion, and shafts; maximum internal stresses in beams; fatigue of metals; working strength for repeated stresses; resilience; reliability of the common theory of flexure as shown by actual experiment; design and strength of rolled and built beams and columns; specifications for materials and methods of testing. *Merriman's Mechanics of Materials. Winter term, full study.* Professor TALBOT.

*Required:* Math., 2, 4, 6, 7; Mechanics, 1.

3. Hydraulics.—In hydraulics the instruction is by text-book and laboratory work.

The subject covers the following: Weight and pressure of water; head; center of pressure, velocity and discharge through orifices, weirs, tubes, pipes, conduits, canals, and rivers; measurement of

pressure, velocity, and discharge; motors and meters; water power. *Merriman's Hydraulics. Spring term, full study.* Professor TALBOT.

*Required:* Math., 2, 4, 6, 7; Mechanics, 1, 2.

### GENERAL ENGINEERING DRAWING.

1. Elements of Draughting.—This term's work is designed as a general preparation for draughting in all branches. Its aim is first, to teach the accurate and intelligent use of instruments and materials; and second, to start the student upon his work with those neat and orderly habits that are invaluable to the competent draughtsman.

   The instruction is given by text-books, lectures and reference to books in the University library. The problems are arranged so as to be of the most practical benefit to the student, and, instead of being copies of similar problems, are designed to throw him upon his own ingenuity in applying his knowledge of principles learned. This work includes geometrical constructions; orthographic, isometric, and cabinet projections of objects from models or given data; sections, drawings finished in line shading and water colors; in all about thirty plates. *Lectures and Blue Prints. Fall term, full study.* Mr. MCLANE.

2. Descriptive Geometry.—The first term's work in this study includes problems on the point, line, and plane, some of the simpler geometrical solids, and shades and shadows. The second term's work takes up plane, single-curved, double-curved, and warped surfaces; the generation and development of the same; sections and intersections. The application of principles and methods in numerous and varied practical problems is a large part of the work in each term, comprising in all the drawing of about thirty-five plates. *Church's Descriptive Geometry. Half of winter term, half study; spring term, full study.* Mr. MCLANE.

   *Required:* General Engineering Drawing, 1.

3. Lettering.—Plain and ornamental alphabets; round and stump writing; titles and title pages. *Winter term, half study.* Mr. MCLANE.

   *Required:* General Engineering Drawing, 1.

### PHYSICS.

The instruction in physics is given by means of lectures and by practice in the laboratory. The work in each course is determined to some extent by the line of study pursued by the student for whom the course is prescribed.

The department of physics has for its quarters a large lecture room provided with conveniences for lecture illustrations, such as projecting lantern, switch board, resistances, motors, etc.; also a laboratory for experimental work, a photometry room, and a photographic dark room.

The equipment consists of a line of apparatus selected from the best makers with especial reference to lecture illustrations and quantitative laboratory work. Large additions have lately been made to the apparatus in this department. The equipment of the electrical laboratory adds greatly to the facilities for the treatment of electricity in general physics.

1. Major Course.—Lectures and Laboratory Work. This course is provided for the students in the College of Engineering and is required of them; it is also open to others wishing a more complete course in physics than course 2. In this course the most important principles of dynamics are taken up first. An elementary treatment of the theory of the potential is then given, followed by a study of the most important phenomena of magnetism and electricity, the treatment of electricity and periodic motion is followed by the discussion of sound, hydrodynamics, optics, thermics, and thermodynamics. The supply of apparatus for measurements is sufficient for fifteen students working at one time on the same experiment. This makes it possible, even with very large classes, for the experimental work in the laboratory to keep pace with the lectures. The laboratory work consists entirely of quantitative measurement made under the personal supervision of the instructors, with instruments of precision. The student is required to do as accurate work as can be done with these instruments. Possible sources of errors are studied and the effects of these errors on the results discussed. The experiments, which are about thirty-five in number, are designed to give the student a practical knowledge of the principles, laws, and phenomena of physical science; they are arranged as far as possible in logical sequence. An effort is made to have each student determine for himself the relation existing between the facts which he has observed and recorded in order to stimulate him to the formation of habits of sound thinking. Reading in standard works on theoretical and experimental physics is assigned from time to time. *Fall, winter, and spring terms, full study.* Assistant Professor SHEA.

   *Required*: Math., 3, or 4.

2. Minor Course.—Lectures and laboratory work. This course is designed to meet the wants of those whose line of study does not require so extended a knowledge of physics as is made in course 1; the

principles taken up will require less mathematical knowledge for discussion, and the laboratory work will include problems that present fewer experimental difficulties. No attempt will be made to cover the whole ground of physics. Elementary mechanics will be taken up at the beginning of the course as a necessary introduction to the study of physics. The behavior of solids and fluids with respect to forces will be carefully discussed and then a brief treatment of magnetism and electricity will be given. *Winter term, full study.* Assistant Professor SHEA.

*Required:* Math., 3, or 4.

### DESCRIPTIVE ASTRONOMY.

1. Descriptive Astronomy.—For students in Colleges of Agriculture, Science and Literature. The aim of this course is to supply (1) a general knowledge of the facts of astronomy, (2) a clear conception of the principles underlying them, and (3) an understanding of the methods of arriving at these facts. The subjects considered are the doctrine of the sphere, the heavenly bodies, their nature, dimensions, characteristics and the influence they exert upon each other by their attractions, radiation, or any other ascertainable cause. The most important instruments of astronomical research are explained; and during favorable weather, the sun, moon, and planets will be studied with the equatorial telescope. Methods of spectroscopic research are discussed, and, as far as possible, illustrated. Illustrative charts and lectures are also occasionally resorted to. *Newcomb and Holden's Astronomy, Advanced Course. Spring term, full study.* Assistant Professor MYERS.

*Required:* Math., 3.

2. Descriptive Astronomy.—For students of the College of Engineering. This course comprises the subject matter of course 1 and, in addition, some of the fundamental principles of celestial mechanics. Astronomy is here taught with a view to its utility rather than as a matter of general information. Students are required to work out problems in latitude and longitude, to deduce from the principles of mechanic's formulæ for weighing the masses of the heavenly bodies against each other, to solve problems involving corrections for parallax, refraction, dip of the horizon, and to determine mathematically the distances, dimensions, and orbits of the bodies of the solar system. When favorable weather admits, the equatorial telescope is in use by students, and time is spent in the location and study of

the constellations. Students are directed to make readings on astronomical subjects of value to be found in astronomical publications in the library, and are frequently required to recite upon them. Though no attempt is made to teach practical astronomy, which is taught as a specialty in civil engineering, the practical features of descriptive astronomy are kept uppermost in this course. *Young's General Astronomy. Spring term, full study.* Assistant Professor MYERS.

*Required:* Math., 4; Physics, 1; Theoretical and Applied Mechanics, 1.

## MECHANICAL ENGINEERING.

1. Shop Practice A.—The course of elementary shop practice has been carefully arranged to familiarize the student with the forms of the parts of machines, and the mode of producing them. He is made familiar with all the ordinary cutting tools for iron and wood; with the form and condition for most effective work; with the machines and appliances by which they are put in action, and the instruments by which desired dimensions of product are obtained.

(*a*) Exercises preparatory to pattern making in wood, consisting of planing, chiseling, boxing, sawing, turning, etc.; pieces are combined by mortise, dovetail, and glue joints. Finally, finished patterns are made.

(*b*) Exercises in chipping and filing, in which true surfaces are produced with the cold chisel and file. After the hand and eye are sufficiently trained, fitting is begun, and the square, bevel, rule, compasses, and other auxiliary bench tools are used. Pieces are then fitted together by the file, with surfaces carefully finished.

(*c*) Blacksmithing, including such operations as drawing, upsetting, punching, welding, tempering, etc.

(*d*) Elementary exercises in machine tool work, in which the student becomes familiar with the various machine tools, such as engine lathes, shapers, planers, etc.

(*e*) Exercises in molding and casting.

(*f*) Machine tool work executed with especial reference to finish and sizes, using calipers, scales, gauges, etc. *Fall, winter, and spring terms, full study.* Mr. ANDERSON and Mr. CLARK.

2. Mechanical Drawing and Construction.—In this course the student is taught the methods peculiar to mechanical drawing. A complete set of drawings is made of some machine or parts of machines. The

time is divided between the drawing room and the machine shop. *Fall, winter, and spring terms, full study.* Mr. ANDERSON and Mr. PHILLIPS.

*Required:* General Engineering Drawing, 1, 2, 3.

3. Mechanism.—In this course the student takes up the parts of machines with reference to the production of required motions. The various forms of gear wheels, cams, link work, etc., are studied. Finished drawings are made, involving the more important problems. *Stahl and Woods's Principles of Mechanism. Fall term, full study.* Professor SCRIBNER.

*Required:* Math., 2, 4, 6; Mechanical Engineering, 1, 2.

4. (*a*) Engineering Materials.—The work of this course includes the characteristic properties of the materials used in construction, and their preparation. The nature and value of fuels for various purposes are also considered.

(*b*) Steam Engineering. This subject is preparatory to the course on heat engines. The steam engine and boiler are taken up with reference to various designs, uses to which the different kinds are best suited, action of the parts, and of steam within the engine.

(*c*) Valve Gears. This is drawing room work and consists of analysis of the simple slide valve, of cut-off valves, and common valve gears by means of diagrams. *Winter term, full study.* Professor SCRIBNER.

*Required:* Shop Practice A; Math., 2, 4, 6; General Engineering Drawing, 1, 2; and for (*c*) Mechanical Engineering, 1, 2, 3.

5. Mechanics of Machinery.—In this course the dimensions of the various parts of machines are computed, the problems relative to shafting, belts, etc., are also taken up. *Unwin's Machine Design. Spring term, full study.* Professor SCRIBNER.

*Required:* Math., 2, 4, 6; General Engineering Drawing, 1, 2, 3; Theoretical and Applied Mechanics, 1, 2; Mechanical Engineering, 1, 2, 3.

6. Heat Engines.—This course includes the problems of thermo-dynamics that arise in the consideration of steam, gas, and other heat engines. *Peabody's Thermo-Dynamics. Fall term, full study.* Professor SCRIBNER.

*Required:* Math., 2, 4, 6, 7; General Engineering Drawing, 1, 2, 3; Mechanical Engineering, 1, 2, 4.

7. Machine Design.—In this course there is undertaken the designing of a steam engine or other machine, the parts of which are carefully

computed and designed in accordance with the best scientific practice. *Fall and spring terms, full study.* Professor SCRIBNER.

*Required:* Math., 2, 4, 6, 7; General Engineering Drawing, 1, 2, 3; Theoretical and Applied Mechanics, 1, 2; Mechanical Engineering, 1, 2, 3, 4, 5.

8. Hydraulic Engines and Wind Wheels.—This is in part a study of the theory and practice of turbine and other water motors, and in part an examination of pumping and other hydraulic machinery. Some of this work is done in the drawing room. *Bodmer's Hydraulic Engines. Winter term, full study.* Professor SCRIBNER.

*Required:* Math., 2, 4, 6, 7; General Engineering Drawing, 1, 2, 3; Theoretical and Applied Mechanics, 1, 2, 3; Mechanical Engineering, 1, 2, 3, 4, 5.

9. Mechanical Laboratory.—The work of this course in the winter term is designed to give the student practical experience in the testing of steam engines and boilers with the apparatus used in such work; methods of transmitting power; value of lubricants; tests of gas engines, pumps, and all apparatus used in engineering practice. *Winter and spring terms, full study.* Professor SCRIBNER.

*Required:* Math., 2, 4, 6, 7; General Engineering Drawing, 1, 2, 3; Theoretical and Applied Mechanics, 1, 2, 3; Mechanical Engineering, 1, 2, 3, 4, 5, 6.

10. Estimates.—In this course estimates are made of the cost of power and heating plants, including the various forms of contracts and specifications. *Spring term, full study.* Professor SCRIBNER.

*Required:* Math., 2, 4, 6; General Engineering Drawing, 1, 2, 3; Theoretical and Applied Mechanics, 1, 2, 3; Mechanical Engineering, 1, 2, 4, 5, 7; Civil Engineering, 5.

## ELECTRICAL ENGINEERING.

1. Electrical Measurements.—This course is designed to bring before the student the systems of electrical units, together with the ordinary problems of electrical measurement and measuring apparatus.

(*a*) Lectures upon the theory of instruments, electrical units, and theory of electricity.

(*b*) Laboratory work consisting of the determination of galvanometer constants, measurements of resistances by the various Wheatstone bridge methods, electro-motive force, and current measurements. *Spring term, full study.* Assistant Professor SHEA.

*Required:* Physics, 1.

2. Electrical Laboratory.—This course is essentially a course of laboratory work, but lectures may be given or text-book work assigned, as is thought best. It includes the measurement of high resistances, cable and line testing, measurements of capacity, the standarizing of ammeters and voltmeters, and electrometer work. The work of the course is taken up with special reference to accuracy and methods of precision. *Fall term, full study.* Mr. KUEHMSTED.

*Required:* Physics, 1; Electrical Engineering, 1.

3. Electro-Magnetism and Dynamo-Electric Machinery.—(*a*) Lectures and text-book work. The theory, design, and classification of dynamo-electric machines and motors is considered, together with the efficiency and methods of governing constant current and constant potential machines.

(*b*) Electrical designing and draughting, supplementing the theoretical work under (*a*). *Winter term, full study.* Mr KUEHMSTED.

*Required:* Electrical Engineering, 1, 2.

4. Dynamo Laboratory—Experimental study of dynamo electric machinery, determination of characteristics and other curves, regulation, etc. *Winter term, full study.* Assistant Professor SHEA and Mr. KUEHMSTED.

*Required:* Electrical Engineering, 1, 2.

5. Alternating Currents and Machines.—(*a*) Lectures and text-book work upon the generation and application of alternating currents, the theory of converters, and the effect of the alternating current.

(*b*) Laboratory practice, consisting of the measurement of the alternating current and testing of alternating current machines. *Spring term, full study.* Mr. KUEHMSTED.

*Required:* Physics, 1; Electrical Engineering, 1, 2, 3, 4.

6. The Installation of Light and Power Plants.—(*a*) Electric Lighting. This includes the methods of wiring for arc and incandescent lighting, wiring, rules and regulations, and estimates on the cost of plants.

(*b*) Electrical Distribution of Power. The distribution of power is taken up with the especial regard to the electric railway, including estimates. *Lectures and Notes. Spring term, half study.* Mr. KUEHMSTED.

*Required:* Electrical Engineering, 1, 3, 4.

7. Photometry.—Lectures and Laboratory Work. This includes the problems of photometry, as found in connection with arc and

incandescent electric lights. *Spring term, half study.* Assistant Professor SHEA.

*Required:* Physics, 1; Electrical Engineering, 1, 2, 3.

## CIVIL ENGINEERING.

1. Land Surveying.—Areas and distances by chain, compass, and plane table; U. S. public land surveys, including legal points involved in the re-establishment of boundaries; magnetic variation and determination of true meridian. The students solve numerous problems in the field with instruments. To facilitate practice in surveying, an area has been specially prepared in which the difficulties of plane surveying are presented to the beginner as he is able to meet them, and where he is taught practical methods of overcoming them. All possible distances, directions, areas, and elevations are accurately known; and hence the instructor knows beforehand the precise result which the student should obtain. This is an incentive to the student and enables the teacher to show him the degree of accuracy attained, and also to point out errors. *Bellows and Hodgman's Surveyors' Manual. Fall term, full study.* Professor BALDWIN.

*Required:* General Engineering Drawing, 1; Math., 4.

2. Topographical Drawing and Surveying.—Topographical drawing is given during the bad weather of the winter term. The student spends about half a term making the standard topographical symbols. This and transit surveying and leveling making one credit.

During the spring term topographical surveying is taught, in which students solve problems with the plane table and the stadia, and make a topographical survey and plot the notes. *Winter and spring terms, half study.* Professor BALDWIN.

*Required:* Math., 4; General Engineering Drawing, 1, 2, 3; Civil Engineering, 1.

3. Transit Surveying and Leveling.—Construction, adjustment, and use of the transit and level; angles, inaccessible distances, and areas with the transit; profiles and contours with the level. Two weeks' time is given to practice in running railroad curves. The department is provided with the instruments necessary for the different branches of engineering field practice, including chains, tapes, compasses, plane tables, stadias, transits, levels, barometers, base rods, and comparing apparatus, sextants, and solar transits. These instruments are in constant use by the students whenever the weather

will permit. *Baker's Engineers' Surveying Instruments. Winter and spring terms, half study.* Professor BALDWIN.

*Required:* Math., 4; General Engineering Drawing, 1, 2, 3; Civil Engineering, 1.

4. Railroad Engineering.—In the field practice, the class makes preliminary and location surveys of a line of railroad of sufficient length to secure familiarity with the methods of actual practice. Each student makes a complete set of notes, maps, profiles, calculations, and estimates. In addition to the mathematical theory of curves, turnouts, crossings, and the calculations of earth work, instruction is given by means of text-books and lectures on the principles of economic location, particularly the effect of distance, grade, and curve upon operation and maintenance, and of methods of construction, equipment, and maintenance of way. *Godwin's Railroad Engineers' Field-Book. Fall term, full study; Winter term, with Municipal Sanitary Engineering, 1, makes a full study.* Professor TALBOT.

*Required:* Math., 4; General Engineering Drawing, 1, 2; Civil Engineering, 1, 2, 3.

5. Masonry Construction.—Requirements and methods of testing stone, brick, cement, and lime; composition, preparation, and strength of mortar and concrete; classification, construction, strength, cost of stone and brick masonry; foundations under water; theory of stability; cost, etc., of dams, retaining walls, bridge piers, bridge abutments, culverts, and arches. The students have experiments in the testing laboratory, in testing cement, mortar, stone, and brick. *Baker's Masonry Construction. Fall term, full study.* Professor BAKER

*Required:* Math., 2, 4, 6, 7; Theoretical and Applied Mechanics, 1, 2; General Engineering Drawing, 1, 2.

6. Geodesy.—Geodesy is taught by lectures and assigned reading. Studies are made of the instruments and methods employed in spirit, barometrical, and trigonometrical leveling; the apparatus and methods used in measuring base lines; the location and construction of stations; the method of measuring the angles and reducing the triangulation; the principles of projecting maps; the methods employed in running parallels and meridians. The apparatus consists of a 12-inch alt-azimuth instrument reading to single seconds, a precise level, aneroid and mercurial barometers, three wooden base rods, a comparator, a steel tape with level, thermometer, and spring

balance. Problems are solved in barometrical, trigonometrical, an precise leveling, and in reading horizontal angles. *Fall term, half study.* Professor BAKER.

*Required:* Math., 4; General Engineering Drawing, 1, 2, 3; Civil Engineering, 1, 3; Descriptive Astronomy, 2.

7. Practical Astronomy.—Is given by lectures, recitations, and practice. The object is to familiarize the students with those principles of practical astronomy employed in extended surveying operations, and also to train the student in methods of exact observations. The apparatus consists of an observatory with three isolated stone piers; a 12-inch alt-azimuth intrument reading by micrometers to single seconds, both of altitude and azimuth; an astronomical transit; three chronometers; two sextants; two solar transits; and a set of meteorological instruments. The problems include the adjustments of all the instruments, and the determination of time, latitude, and azimuth by the several methods. *Loomis's Practical Astronomy. Fall term, half study.* Professor BAKER.

*Required:* Math. 4; General Engineering Drawing, 1, 2, 3; Civil Engineering, 1, 3; Descriptive Astronomy, 2.

8. Bridges.—The instruction in bridges occupies two terms. The first —bridge analysis—is devoted to the calculations of the strains in the various forms of bridge trusses, by algebraic and graphical methods, consideration being given to weights of bridge and train, and force of wind. The second—bridge design—is devoted to designing bridges, proportioning sections, and working out of details. Each student designs and makes a full set of drawings of a bridge. The apparatus consists of a series of full sized joints and connections of a modern iron railroad bridge, numerous models of bridges, a large collection of drawings, photographs, and lithographs of bridges. *DuBois's Strains in Framed Structures. Winter and spring terms, full study.* Professor BAKER.

*Required:* Theoretical and Applied Mechanics, 1, 2; Architecture, 6.

9. Tunneling.—This course, treating of methods of tunneling and mine attack, is given to students of civil engineering. The lectures treat first of the nature and use of explosives, compressed air and power drills. The methods of tunneling are then explained and discussed with their accompanying methods of timbering and walling. Attention is given to the sinking of shafts for the working of tunnels, or for the purposes of driving. The details of the duties of a tunnel

engineer are made as clear and concise as possible. Some time is given in the earlier part of the course to the practice in hydraulics, boring wells, dredging, and quarrying. *Spring term, full study.* Professor BALDWIN.

*Required:* Math., 2, 4, 6; General Engineering Drawing, 1, 2; Shop Practice A; Mechanical Engineering, 4; Chemistry, 1; Physics, 1.

10. Surveying.—For students in the courses of architecture, architectural engineering, and mechanical engineering. Areas with chain and compass; U. S. public land surveys, and principles of re-establishing corners; use of transit in finding distances, areas, and in laying out buildings; use of the level in finding profiles and contours. *Baker's Engineers' Surveying Instruments. Spring term, full study.* Professor BAKER.

*Required:* Math., 4; General Engineering Drawing, 1, 3; Physics, 1.

## MUNICIPAL ENGINEERING.

1. Road Engineering.—Instruction is given by means of text-books and lectures. In country highways the value and importance of road improvement and the best means of securing it are considered, together with the principles and details of construction of earth, gravel, and macadam roads. In city streets, the methods of construction, cost, durability, and desirability of the various kinds of pavement, and the question of grades, cross sections, methods of assessment of cost, and methods of maintenance and cleaning are treated. *Gilmore's Roads, Streets, and Pavements; Lectures and Reading. Winter term, with Civil Engineering, 4, makes a full study.* Professor TALBOT.

*Required:* Math., 4; General Engineering Drawing, 1, 2; Civil Engineering, 1, 2, 3, 4.

2. Water Supply Engineering.—This subject is intended to cover the principal features of the construction of water-works, including the tests and standards of purity of potable water; the choice of source of supply; the designing of the distribution system, pumps and pumping machinery, reservoirs, stand-pipes, and the filtration of water. *Lectures; Fanning's Water Supply Engineering. Fall term, full study.* Professor TALBOT.

*Required:* Theoretical and Applied Mechanics, 1, 3; Chemistry, 1; Mechanical Engineering, 4 (*b*).

3. Sewerage.—The design and methods of construction of sewerage systems for cities, including the following: sanitary necessity of sewerage; water carriage systems, both separate and combined; surveys and general plans; hydraulics of sewers; relation of rainfall to storm water flow, and determination of size and capacity of sewers; house sewage and its removal; form, size, design, and construction of sewers and sewer appurtenances; modern methods of sewage disposal by filtration, chemical precipitation, irrigation, etc., with resultant changes in the sewage; estimates and specifications. *Lectures; Staley and Pierson's Separate System of Sewerage. Winter term, full study.* Professor TALBOT.

*Required:* Theoretical and Applied Mechanics, 1, 3; Chemistry, 1.

4. Botany.—This is a study of the lowest orders of plants, including such species as are most commonly met with in microscopical examinations of water, and found associated with putrescent substances. Lectures or recitations and microscopical laboratory work. This is practically the same as the first part of the second term of botany 1, in College of Science. *Winter term, half study.* Professor BURRILL.

5. Bacteriology.—For students in course in municipal engineering. This course includes the identification and classification of bacteria, and of allied organisms, their relations to health and to disease, the methods of separation and cultivation, and the methods of air and water analysis. The laboratory is furnished with sterilizers, culture ovens, microscopes, etc.; and students have abundant opportunity to do practical work. This is at first the same as bacteriology 1, in the College of Science, but in the latter part of the term special investigations are undertaken by the engineering students. *Fall term, full study.* Professor BURRILL.

*Required:* Municipal and Sanitary Eugineering, 4.

## MINING ENGINEERING.

1. Mine attack.—This includes the means and methods of attack, and the transportation of products to the surface, as follows: (1) tools, implements, machinery, explosives, stripping, boring, sinking, drifting, etc.; (2) timbering; (3) haulage; (4) hoisting; (5) ventilation; (6) drainage. There are coal mining districts within easy reach, and the mine managers offer to students every facility for visiting and inspecting the mines.

Diagrams, charts, models, and full sized tools and machines in possession of the University, are used in illustrating the lectures. *Fall term, full study.* Professor BALDWIN.

*Required:* Math., 4; Chemistry, 1, 6; Physics, 1.

2. Mine Surveying.—Instruction is given by lectures and recitations, and includes the use of the solar compass, solar attachments, practice of the U. S. deputy surveyors, traverse survey with inclined measurements, connection of surveys above and below ground, and the determination of the position of bore holes, drifts, and shafts from data given or acquired by the students. The field work is carried along with the lectures. The University has three transit instruments especially adapted for underground work. The field work is under the personal supervision of the instructor, and all checks are made by the students, as in regular surveys. Complete plats, maps, drawings and calculations are required for all field work.

Surveying in the mines for two weeks at the end of the term familiarizes the students with the peculiar features and difficulties of underground practice. *Spring term, full study.* Professor BALDWIN.

*Required:* Math., 4; General Engineering Drawing, 1, 3; Civil Engineering, 1, 2, 3.

3. Ore Dressing.—The fall term is devoted to ore dressing, and the course comprises lectures upon properties of ores in respect to subsequent treatment; theory of jigging and treatment of slimes; hand dressing; machine crushing, crushers, rolls, stamp mills, and pulverizers, etc.; sizing machinery, classifiers, and separators, etc.; sorting machinery; comparative economy and efficiency of different methods of treatment; typical dressing works. During the entire course the the students work in the laboratory, making mill and experimental tests upon a large scale. The laboratory is equipped for this purpose with a Dodge crusher, a pair of Cornish rolls, elevators with deflecting spouts, automatic sampler, sizing screens, jigs, hydraulic separator and rotating table. There is also a chlorine generator with tanks and vats. The machines are all of regular working size, driven with gearing by a steam engine, and worked in accordance with the practice of milling and testing laboratories. A complete series of assays is made of the products from each machine, and schemes of treatment and the speeding of the machine are worked out from the data. *Fall term, full study.* Professor BALDWIN.

*Required:* Chemistry, 1, 6; Physics, 1; Mining Engineering, 1, 2.

4. Mine Engineering.—Two terms are devoted mainly to the technical and professional branches of mining. The exploration, development and exploitation of mines are considered at length. The complications which arise are specially brought out from the study of typical mines. Instruction in mine management and mine accounts is given. Calculations and designs from actual data are required from the students. The operation of machines and apparatus, ventilation, etc., are explained in accordance with the principles underlying them, as well as from the standpoint of practice. *Fall, winter, and spring terms, full study.* Professor BALDWIN.

*Required:* Chemistry, 1, 6; Physics, 1; Mine Engineering, 1, 2, 3.

## ARCHITECTURE.

1. Shop Practice B.—To give a practical knowledge of various kinds of work, three terms are devoted to a course of instruction which all architectural students are required to pursue, unless they have previously had equivalent practice and obtained credit therefor.

*First Term.*—Carpentry and Joinery. Planing flat, square, and octagonal prisms and cylinders; framing with single, double, and oblique tenons; splices, straight and scarfed; miter, lap, and gained joints; through and lap dovetails; moldings, miters, miter-box, and panels.

*Second Term.*—Turning and Cabinet Making. Glue joints; moldings; inlaying; ornamental veneering; turning cylinders, balusters, ornamental forms, capitals, rosettes, vases, etc.

*Third Term.*—Construction of portions of buildings or of complete architectural structures at a reduced scale; roof trusses, stairs, frames of wooden buildings, etc., made from drawings. *Fall, winter, and spring terms, full study.* Mr. PARKER.

2. General Architectural Construction.—(*a*) Wood Construction. Formulæ and data for computing the dimensions and strengths of columns, rods, beams, girders, etc., of wood or metal are first given and then applied in the solution of numerous examples. The kinds of wood and their uses in construction and decoration, their seasoning, shrinkage, defects, and modes of protection from decay, are next studied. The construction and design of wooden floors, walls, ceilings, and roofs are then treated, and afterwards, joinery, comprising doors, windows, bays, inside finish, cornices, wainscoting, etc. The

construction and design of stairs of the various types terminate the work of the term. About twenty problems are worked out on as many plates by the student.

(*b*) Stone, Brick, and Metal Construction. Foundations of stone, brick, concrete, and on piles, are first studied. Then the materials employed in stone masonry, their uses, defects, qualities, and mode of preparation. Kinds of masonry and external finish. Tools and methods of stone cutting. The preparation of working drawings is illustrated by practical applications in the study of the arch, the vault, and the dome. Brick masonry is next examined, with its materials and bonds, and several examples are drawn. The manufacture and refining of cast-iron, wrought-iron, and steel are then studied, together with the processes of pattern making, molding, casting, refining, rolling, etc., as well as the stock or standard dimensions or sections to be obtained in the market. The special properties and value of each metal in a structure, the designing of a line of columns in a tall mercantile building, and of beams and girders, together with the study of joints and connections completes the work of the term. About twelve problems are drawn on the same number of plates. *Ricker's Wood, Stone, Brick, and Metal Construction; Macfarlane's Elementary Mathematical Tables. Fall and winter terms, full study.* Mr. WHITE.

*Required:* Shop Practice B; General Engineering Drawing, 1, 2, 3.

3. Sanitary Construction.—Daily recitations or special lectures, with designs for special problems. The study of plumbing, trap ventilation, removal of wastes, construction of water closets, drains and systems of water supply; sewage disposal. Hot water supply and fixtures in dwellings. *Gerhard's Drainage and Sewerage of Dwellings; Lectures on Sewage Disposal; Dye's Hot Water Supply. Spring term, full study.* Mr. WHITE.

*Required:* Math., 4; Shop Practice B; Physics, 1.

4. Architectural Drawing.—(*a*) The subjects of instruction are the different methods of finishing architectural drawings in line and washes, the use of the orders, and the study of shades and shadows, these being combined to produce the greatest benefit, so far as possible. Penciling, inking, washing, and tinting drawings are practiced, as well as obtaining cast shades and shadows. The single plane method is preferred for this purpose, and is found applicable to most cases. The orders are drawn in plan and elevation, as well as superposed, and the shades and shadows are found on a capital and base, drawn

at large scale. Drawings are finished in ink, ink wash, sepia, and various tints. Lectures and special instruction in shades and shadows.

(*b*) The second term is devoted to instruction in the office style of preparing working drawings for a given building. Rough figured sketches are furnished to the student, from which each student makes a set of general and detail drawings in pencil on opaque paper. These are then traced in ink on transparent paper or linen and colored to indicate materials. Especial care is taken to secure neat lettering and accurately figured dimensions. Personal instruction to each member of the class. *Vignola's Five Orders. Fall and winter terms, full study.* Mr. White.

*Required:* General Engineering Drawing, 1, 2, 3; Architecture, 2.

5. History of Architecture.—Two terms' work, usually divided at the beginning of the Romanesque style. Commencing with the Egyptian and ending with the Renaissance, a careful study is made of each of the more important styles, successively examining the historical conditions, the local and inherited influences, the structural materials and system, the special ornaments, and the purposes and designs of the buildings, with an examination of a few of the most important typical examples of the styles. Especial attention is given to any ideas that might be useful or suggestive in American work, and to tracing the gradual evolution of architectural forms. This study therefore becomes a very interesting branch of the history of human civilization. References are made to numerous works, especially to Fergusson, Lubke, Durm, Reber, Gailhabaud, etc. *Ricker's Notes on History of Architecture; Goodyear's History of Art. Winter and spring terms, full study.* Professor Ricker.

*Required:* Architecture, 2, 3, 4 (*a*).

6. Roofs.—This term is devoted to the elements of graphic statics, and to the applications of the science in the designing of trussed roofs. The composition and resolution of forces, equilibrium, reactions, moments, bending moments, and shears on beams, center of gravity and moment of inertia of any form of cross sections, are first examined. The construction of wooden and of metallic roofs is next studied, then the mode of computing permanent and temporary loads on roof trusses, of obtaining end reactions, of drawing strain diagrams, determining sectional dimensions of members, and ending with the designing of joint connections. Numerous problems are solved, five different types of trusses are usually worked out,

complete designs and details being made for one of wood and another of iron or steel. *Ricker's Trussed Roofs. Spring term, full study.* Mr. WHITE.

*Required:* Math., 2, 4, 6, 7; Theoretical and Applied Mechanics, 1, 2; Architecture, 2, 3, 4 (except for students in civil, municipal, and mining engineering courses).

7. Architectural Perspective.—The theory of perspective is taught, with all labor saving methods of abbreviating the labor, and designing in perspective itself is made a special aim, this power being very useful to a draughtsman in preparing sketches for clients. Methods of diagonals, by triangles, and by coördinates are all used. Problems in angular, parallel, vertical, and curlvilinear perspective, as well as in perspective shades and shadows, are solved, requiring original work as far as possible, so as thoroughly to prepare the student for any kind of work in perspective, instead of restricting him to the study and use of a single system. Six problems are worked out on as many plates. *Ware's Modern Perspective. Fall term, full study.* Mr. WHITE.

*Required:* Architecture, 2, 3, 4.

8. Superintendence, Estimates, and Specifications.—This study comprises several specialties in office work, not otherwise provided for, so far as they can be taught in a professional school. One-third the time is devoted to superintendence, one-half to estimates, and the remainder to specifications, contracts, etc.

*Clarke's Building Superintendence* is carefully read with daily recitations.

In estimates the purpose of the instruction it to impart a knowledge of the usual methods of measurement of materials and work, the arrangement of computations in proper and convenient orders, and an acquaintance with approximate prices of materials and labor, which vary in different localities. The methods of squaring, cubing, of units, and of quantities, are each employed and illustrated by numerous examples.

In specifications, practice is obtained by writing out a complete set for a house, drawings for which have been previously made by the student.

*Groves's Specification Blanks* are employed.

The standard *Contract of the American Institute of Architects* is used, being first carefully studied, then filled out for the same house.

Bids, certificates, etc., are also prepared. *Ricker's Notes on Estimates; Wohlgemuth's Ready Reckoner. Fall term, full study.* Professor RICKER.

*Required:* Architecture, 2, 3, 4, 5.

9. Advanced Graphics.—This continues the study of graphic statics, commenced in roofs, with applications to metallic roofs of wide spans, roof trusses, of curved or arched form, and those supported by abutments and also jointed. Continuous girders are also examined, with the effect of moving loads on girders, the instruction ending with the graphical analysis of the arch, vault, and dome, and of the Gothic system of vault and buttress. Instruction is imparted by special lectures, and applications are made to a series of problems in designs for specified cases. References to *Planat's Mecanique Applique; Landsberg's Statik; DuBois and Clarke's Graphical Statics; Levy's Statique Graphique* (*Last Ed.*). *Fall term, full study.* Professor RICKER.

*Required:* Math., 2, 4, 6, 7; Theoretical and Applied Mechanics, 1, 2; Architecture, 2, 4, 6.

10. Heating and Ventilation.—A full knowledge of the scientific theory and of the practice of warming and ventilating buildings is the purpose of this study. Commencing with the fuels and the production of heat, the student passes to the flow of gases though ajutages and pipes, applying these data to the calculation of the dimensions of air ducts and chimneys. The different systems of heating by furnaces, hot water, steam, etc., are next examined, with the details of each. The sources of impurity in the air and the requirements of good ventilation are then considered, with the different methods of ventilation by aspiration, by fans, etc., ending with the study of fans of different types. Numerous problems are given. *Ricker's Abridged Translation of Planat's Chauffage et Ventilation. Winter term, full study.* Professor RICKER.

*Required:* Math., 4; Architecture, 2, 3, 4, 8; Physics, 1; Chemistry, 1.

11. Architectural Designing.—(*a*) Since students often find considerable difficulty when commencing to express their ideas in designs, several simple problems are first given, such as a tower, a store with flats over it, a small library, etc., usually five being studied during the term. Each student makes sketches at small scale, which are criticised and modified until approved, then worked out in plans,

elevations, and details, one elevation being washed to show color or shade effects. The object is to obtain as much practice in original design as possible, and in the making of rapid and effective sketches, suitable for submission to a client or employer.

(*b*) Further practice in design and the study of the requirements of dwellings of moderate size are the objects of the study. Several typical plans are selected as bases, and numerous changes suggested, which usually produce radical changes in the design. The student is also encouraged to make working drawings for actual clients, criticisms and suggestions being freely made to him. The work is limited to residences, since this class of buildings is likely to afford the graduate his first opportunity for independent original work, and practice in satisfying their requirements is considered to be more valuable than the study of theoretical or impossible problems. The designing of a convenient, attractive dwelling, to cost a limited amount, is really a quite difficult problem, requiring more time and thought than any other building of equal cost *Gibson's Convenient Houses. Winter and spring terms, full study.* Professor RICKER.

*Required:* Architecture, 2, 3, 4.

12. Esthetics of Architecture.—Subject, the laws of correct design, so far as these may be formulated in words, illustrated by the study of numerous examples. Commences with the study of the nature and mode of working of the different materials used in structural and ornamental purposes, deducing the proper ornamental treatment for each, then taking up the proper decoration of walls, ceilings, and roofs. The general principles of ornamentation are next stated, as applied to flat surfaces and to solids of various shapes. A full study of the various materials used in furniture, art works, etc., is then made, with suggestions of their proper use in the art industries. About twenty problems in original design are worked out on as many plates *Ricker's (abridged) Translation of Redtenbacher's Architiktonik; Mayeux Decorative Composition. Spring term, full study.* Professor RICKER.

*Required:* Architecture, 2, 3, 4, 5, 7, 13.

13. Architect's Course in Artistic Drawing and Modeling. For second year students.

First term. Principles of free hand drawing and light and shade learned from drawing geometric solids (*a*) in outline; (*b*) in washes of water color; (*c*) in values of charcoal.

Second term. Principles applied by drawing (*a*) groups of common objects, as books, vases, chairs, tables, etc.; (*b*) casts of ornament; (*c*) interiors, as the corner of the room; (*d*) plants and flowers from nature. Special attention is given the work from casts and interiors.

Third term. Rendering perspectives in washes of water color (sepia). Sketching from nature.

Lectures are given throughout the year on design and the historic styles of ornament. Students are required to prepare (*a*) a monograph of the ancient, mediæval, or modern styles; (*b*) original exercises showing principles and methods; (*c*) original exercises employing color.

Lectures on perspective are given the second term, and the problems then worked out are illustrated by sketches from nature and made during the third term.

Instruction in pen etching is given throughout the year, but most of the work must be done out of hours. *Gregg's Architectural Rendering in Pen and Ink. Fall, winter, and spring terms, full study.* Professor FREDERICK.

*Required:* Elements of Draughting.

14. Architect's Course in Artistic Drawing and Modeling. For fourth year students.

First term. Modeling in clay (*a*) details of human face; (*b*) copy of cast of ornament; (*c*) ornament from photograph. Casts are made of (*a*) at least one modeled piece; (*b*) arm, hand, or foot from nature; (*c*) foliage, fruit, or vegetable from nature. One original design required.

Second term. Study of color as a means of exterior and interior decoration, at least one color scheme to be worked out, full size, in tempera colors. In place of this a second term of modeling can be taken.

Third term. Work in water colors, groups, flowers, and perspectives, or sketching from the antique and life. Sketching from nature in color. *Fall, winter, and spring terms. Full study.* Professor FREDERICK.

*Required:* Architecture, 13.

## ADDITIONAL SUBJECTS.

The following subjects, offered to students in the College of Engineering, are described elsewhere as noted:

In College of Science—

Chemistry, 1, 2, 3, and 6; Mineralogy, 1; Geology, 1, 3; Metallurgy, 1.

In College of Literature—

French, 4; German, 4; English, 1, 2; Themes and Elocution, 1; Constitutional History, 3; Political Economy, 1.

In School of Military Science—

Drill Regulations for Infantry, 1; Drill Practice, 2.

School of Art and Design—

Free Hand Drawing, 5.

## MECHANICAL ENGINEERING.

This course is designed to prepare students for the profession of mechanical engineering. It aims to fit them to invent, design, construct, and manage machinery for any branch of manufactures. There is a great demand for men, who, to a thorough knowledge of the principles of machinery and of the various motors, add the practical skill necessary to design and construct the machines by which these motors are made to work.

### Instruction.

The instruction, while severely scientific, is thoroughly practical. It aims at a clear understanding and mastery of all mechanical principles and devices. Practice in the workshop is required as one of the studies of the course.

In principles instruction is imparted by lectures, illustrated plates, and text books. Examples are given, showing the application of the theories and principles taught. Experiments in the testing of machines and motors are undertaken by the student.

In practice elementary forms are produced and projects are executed, in which the student constructs machines, or parts thereof, of his own designing, and from his own working drawings.

In designing the student begins with elements and proceeds with progressive exercises till he is able to design and represent complete machines.

### Equipment.

The provisions for shop instruction consist of a large, well lighted machine shop, a pattern shop, a blacksmith shop, and a foundry.

The machine shop is supplied with twelve first-class engine lathes, ranging from twelve- to twenty-four-inch swing, ten hand lathes, two

shapers, a planer, two milling machines, three drill presses, one punching machine, a Brown & Sharpe universal grinding machine, sixteen vises and the corresponding sets of bench tools. This shop is also provided with complete sets of standard gauges, reamers, arbors, drillers, etc.

The pattern shop is provided with thirty-two benches, each supplied with a case of wood-working tools.

The blacksmith shop contains sixteen forges, fitted with power blast, sixteen anvils and sets of blacksmith tools.

The foundry is equipped with a cupola for melting iron, the necessary sand, ladles, flasks, etc., for making the castings which are afterward to be used in the machine shop.

The laboratory is also supplied with dynamometers, friction brakes, calorimeters, steam engine indicators, and other apparatus for carrying on mechanical laboratory work. A 50-horse power high speed engine, made by the students in the machine shop, furnishes power and is available for testing purposes. Three other steam engines, a gas engine, and several boilers of different makes furnish ample material for testing by the students in this department.

### Course in Mechanical Engineering.

#### FIRST YEAR.

1. Advanced Algebra; Elements of Draughting; Shop Practice; French, German, or English; Military.
2. Trigonometry; Descriptive Geometry and Lettering; Shop Practice; French, German, or English; Military.
3. Analytical Geometry; Advanced Descriptive Geometry; Shop Practice; French, German, or English; Military.

#### SECOND YEAR.

1. Differential Calculus; Mechanical Drawing and Construction; Physics; Military.
2. Advanced Analytical Geometry; Mechanical Drawing and Construction; Physics; Military.
3 Integral Calculus; Mechanical Drawing and Construction; Physics; Military.

#### THIRD YEAR.

1. Analytical Mechanics; Mechanism; Chemistry; Themes and Elocution.
2. Resistance of Materials; Engineering Materials; Chemistry; Themes and Elocution.
3. Hydraulics; Mechanics of Machinery; Electrical Measurements, or Surveying; Themes and Elocution.

MECHANICAL SHOP

MECHANICAL LABORATORY

CIVIL ENGINEERING INSTRUMENTS

ELECTRICAL LABORATORY

FOURTH YEAR.

1. Heat Engines; Machine Design; Masonry Construction.
2. Hydraulic Engines and Wind Wheels; Mechanical Laboratory; Dynamo Electrical Machines; Thesis.
3. Estimates; Mechanical Laboratory; Mechanical Design; Thesis.

## ELECTRICAL ENGINEERING.

The course is intended to give young men the best possible preparation for work in the practical applications of electricity. Instruction is given by lectures and laboratory practice. The student is encouraged to add to his general intellectual culture by systematic reading of the best periodical literature in theoretical and applied electricity. By keeping himself informed about the best efforts of others in every department of his profession it is hoped that he may be stimulated to independent and original investigation in his own field. To this end a department reading room at all times accessible to students in this course has been recently established, where the leading journals of general physics and applied electricity are kept on file. The instructors and students meet weekly to discuss the leading articles in these journals. A critical discussion of one or more papers is required from each student.

The electrical laboratory occupies a large room on the ground floor, fitted with masonry piers for the more sensitive instruments, and cases for apparatus. In this room the work relating to the measurement of current, resistance, electro-motor force, the standardizing of measurement aparatus, etc., is carried on.

In addition to this are a photometry room, fitted out with a Queen & Co.'s complete electric light photometer and intended especially for photometric work in connection with electric lighting; a battery room containing a large storage battery and a collection of all the leading primary cells which are used for current and testing purposes; a dynamo room supplied with power from a fifteen-horse power gas engine and sixty-horse power, high speed steam engine, both of which are used exclusively for this department and experimental work. In this room are to be found the leading types of dynamos and motors with conveniences for illustrating and testing them. A complete Thomson-Houston alternating plant and a 6000-watt Edison dynamo have lately been added to the equipment of this room.

Adjacent to the dynamo room is a workshop supplied with power from an electric motor. The shop is supplied with an engine lathe and a line of fine tools suited to the manufacture of special apparatus.

*Equipment.*—The electrical laboratory has been supplied with apparatus from the leading makers at home and abroad. There are several forms of the Wheatstone bridge, resistance boxes, including an Anthony 100,000-ohm box, and a Nalder Bros. subdivided megohm box, an assortment of switches, keys, condensers, and the leading forms of deadbeat and ballistic galvanometers, including a Thompson high resistance, and an Edelman deadbeat galvanometer; also several D'Arsonval galvanometers, and numerous others. Several reading telescopes are used in connection with the galvanometers. The laboratory is also supplied with certified standards of resistance, standard cells, Kelvin's current balances, ammeters, voltmeters, and watt-meters. Current is brought to the room from the dynamo and battery rooms. At present a very large addition to the collection of fine testing instruments is making.

### Course in Electrical Engineering.

#### FIRST YEAR.

1. Advanced Algebra; Elements of Draughting; Shop Practice; French, German, or English; Military.
2. Trigonometry; Descriptive Geometry and Lettering; Shop Practice; French, German, or English; Military.
3. Analytical Geometry; Advanced Descriptive Geometry; Shop Practice; French, German, or English; Military.

#### SECOND YEAR.

1. Differential Calculus; Mechanical Drawing and Construction; Physics; Military.
2. Advanced Analytical Geometry; Mechanical Drawing and Construction; Physics; Military.
3. Integral Calculus; Mechanical Drawing and Construction; Physics; Military.

#### THIRD YEAR.

1. Analytical Mechanics; Mechanism; Chemistry; Themes and Elocution.
2. Resistance of Materials; Engineering Materials; Chemistry; Themes and Elocution.
3. Hydraulics (one-half term); Chemistry (one-half term); Mechanics of Machinery; Electrical Measurements; Themes and Elocution.

#### FOURTH YEAR.

1. Machine Design; Heat Engines; Electrical Laboratory.
2. Hydraulic Engines; Dynamo-Electrical Machines; Dynamo Laboratory; Thesis.
3. Installation of Light and Power Plants and Photometry; Alternating Currents and Machines; Political Economy, or Astronomy; Thesis.

## CIVIL ENGINEERING.

The design is to furnish a course of theoretical instruction, accompanied and illustrated by a large amount of practice, which will enable the student to enter intelligently upon the various and important duties of the civil engineer.

### Instruction.

While the instruction aims to be practical by giving the student information and practice directly applicable in his future professional work, the prime object is the development of the mental faculties. The power to acquire information and the ability to use it, is held to be of far greater value than any amount of so-called practical acquirements. The method of instruction consists in coupling the development of intellectual power with the acquisition of information directly useful to the civil engineer in his profession.

The instruction is given by lectures, text-books, and reading, to which are added numerous problems and practical exercises, as will serve best to explain principles completely and fix them in the mind. Models and instruments are continually used, both in lectures and by the students.

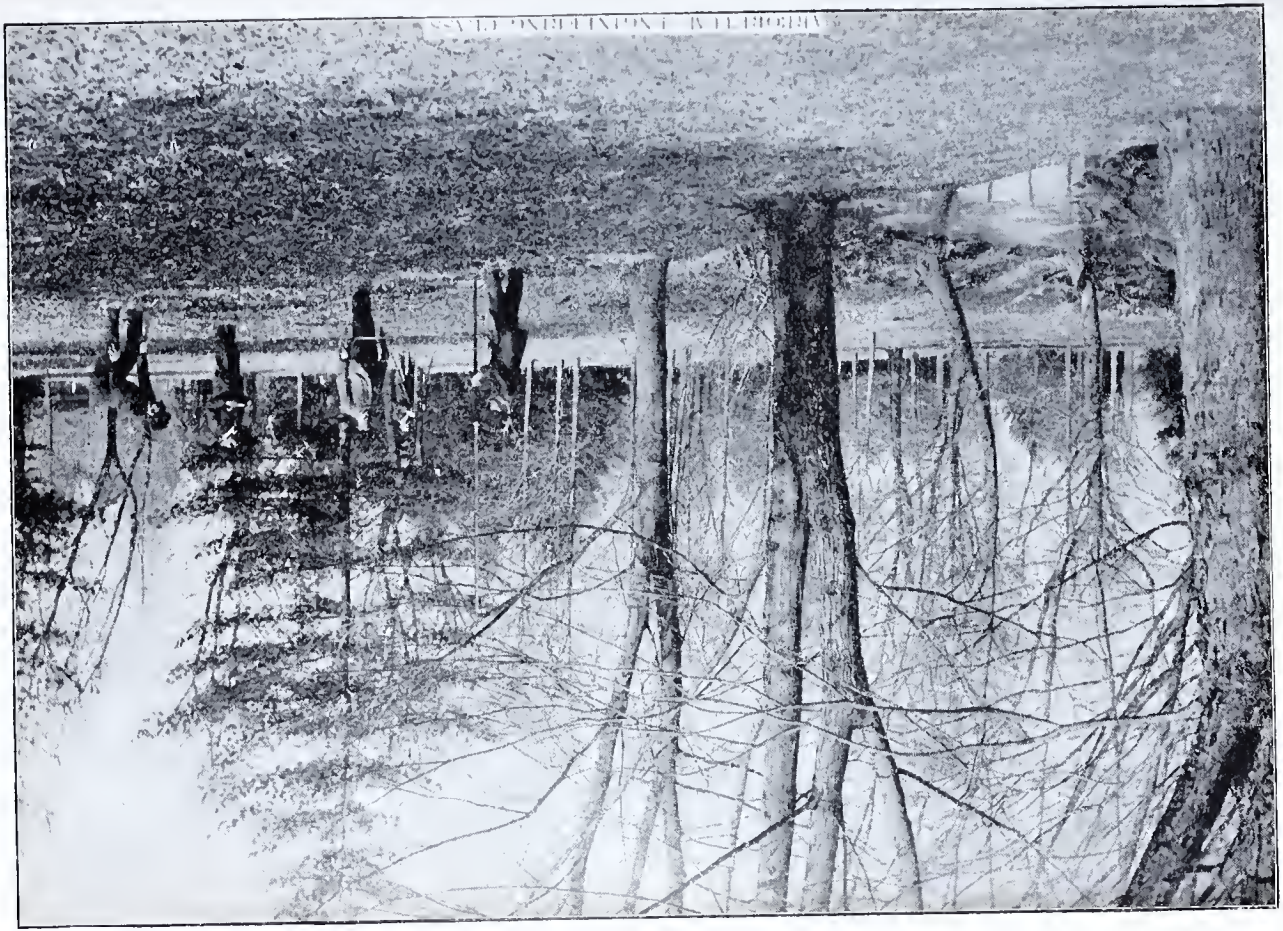
### Course of Study.

The complete course occupies four years. The several subjects included therein are shown in the list below. Each study requires five recitations per week and should receive daily from three to four hours of the student's time. Some of the class exercises occupy one hour daily, while others require two hours; as a rule the latter require less time for preparation. The order of studies as given by the year and term in the tabular view of the course, should be closely followed to avoid interference in hours of recitation, and because the studies are there given in the order which best meets the preparation of the student.

### Course in Civil Engineering.

#### FIRST YEAR.

1. Advanced Algebra; Elements of Draughting; Shop Practice; French, German, or English; Military.
2. Trigonometry; Descriptive Geometry and Lettering; Shop Practice; French, German, or English; Military.
3. Analytical Geometry; Advanced Descriptive Geometry; Shop Practice; French, German, or English; Military.



SECOND YEAR.

1. Differential Calculus; Land Surveying; Physics; Military.
2. Advanced Analytical Geometry; Topographical Drawing and Transit Surveying and Leveling; Physics; Military.
3. Integral Calculus; Topographical Surveying; Physics; Military.

THIRD YEAR.

1. Analytical Mechanics; Railroad Engineering; Chemistry; Themes and Elocution.
2. Resistance of Materials, Railroad and Road Engineering; Engineering Materials; Themes and Elocution.
3. Hydraulics; Astronomy; Roofs; Themes and Elocution.

FOURTH YEAR.

1. Masonry Construction; Geodesy and Practical Astronomy; Water Supply Engineering.
2. Bridge Analysis; Sewerage; Geology; Thesis.
3. Bridge Designing; Tunneling; Political Economy; Thesis.

## MUNICIPAL AND SANITARY ENGINEERING.

This course is a modification of the civil engineering course and is designed for students intending to make a specialty of city engineering work. It includes the study of chemistry and bacteriology necessary to a comprehension of the questions involved in water supply and sewage disposal.

### Course in Municipal and Sanitary Engineering.

FIRST YEAR.

1. Advanced Algebra; Elements of Draughting; Shop Practice; French, German, or English; Military.
2. Trigonometry; Descriptive Geometry and Lettering; Shop Practice; French, German, or English; Military.
3. Analytical Geometry; Advanced Descriptive Geometry; Shop Practice; French, German, or English; Military.

SECOND YEAR.

1. Differential Calculus; Land Surveying; Physics; Military.
2. Advanced Analytical Geometry; Topographical Drawing, and Transit Surveying and Leveling; Physics; Military.
3. Integral Calculus; Topographical Surveying; Physics; Military.

THIRD YEAR.

1. Railroad Engineering; Analytical Mechanics; Chemistry; Themes and Elocution.

2. Railroad and Road Engineering; Resistance of Materials; Botany, one-half term; Steam Engineering, one-half term; Themes and Elocution.
3. Roofs; Hydraulics; Electrical Measurements; Themes and Elocution.

FOURTH YEAR.

1. Water Supply Engineering; Masonry Construction; Bacteriology.
2. Sewerage; Bridge Analysis; Chemistry.
3. Tunneling; Bridge Designing; Chemistry.

## MINING ENGINEERING.

This course has been provided to meet the growing demand of a very important industry, the subjects of which are the discovery, opening, economical working and proper ventilation of mines; the prevention of accidents; transportation above and below ground; treatment of products; with many others which fall within the scope of the mining engineer. It is important that a broad basis be laid by way of general preparation for the more technical studies here included. Whatever of general culture the student may obtain before entering the University, will not come amiss, and, although the requirement is not made, it is advised that all who can do so should acquire a reading knowledge of French or German before beginning this course.

The course comprises the greater part of the pure and applied mathematics of the courses in mechanical and civil engineering. Much time is devoted to chemistry and geology, with the addition of metallurgy and other technical studies peculiar to mining engineering.

Students who are graduated from this course are not supposed to be familiar with all the details of mine management from actual experience; but they will have obtained such a knowledge of the principles underlying all successful practice, and such a familiarity with the science of mining in all its branches, that the art may be acquired with the minimum of practice.

### Instruction.

Lectures are given when desirable, but these are to be regarded as supplementary to other modes of instruction which are made to conform as closely as possible to the routine of the engineer in practice. In every detail the student is made to feel that he is dealing with the actual problems which he will meet in his professional work.

Plans, estimates, drawings, reports, and calculations, based upon data obtained in the student's own experience, are constantly required,

and no pains is spared to familiarize each member of the class with duties and responsibilities of every grade, from miner to manager.

### Course of Study.

In the first two years the work is similar to that required in the course in civil engineering, but more time is given to chemistry. In the third year geology and mine engineering, with assaying and metallurgy, take the place of special technical studies in the other engineering courses. In the fourth year strictly technical studies are continued, with others taken with the mechanical engineers, and with some of a more general character.

### Mining Engineering Course.

#### FIRST YEAR.

1. Advanced Algebra; Elements of Draughting; Chemistry; French, German, or English; Military.
2. Trigonometry; Descriptive Geometry and Lettering; Chemistry; French, German, or English; Military.
3. Analytical Geometry; Advanced Descriptive Geometry; Chemistry; French, German, or English; Military.

#### SECOND YEAR.

1. Differential Calculus; Land Surveying; Physics; Military.
2. Advanced Analytical Geometry; Topographical Drawing and Transit Surveying and Leveling; Physics; Military.
4. Integral Calculus; Topographical Surveying; Physics; Military.

#### THIRD YEAR.

1. Analytical Mechanics; Mine Attack; Mineralogy; Themes and Elocution.
2. Resistance of Materials; Assaying; Geology; Themes and Elocution.
3. Hydraulics; Mine Surveying; Geology; Themes and Elocution.

#### FOURTH YEAR.

1. Ore Dressing; Heat Engines; Geology.
2. Mine Engineering; Hydraulic Engines; Chemistry.
3. Mine Engineering; Chemistry; Metallurgy.

## ARCHITECTURE.

The object of this course of study is to prepare graduates for the profession of architecture, as architects, draughtsmen, and superintendents of construction. A thorough knowledge of scientific principles applied to construction, and of drawing in its various developments, a practical acquaintance with the methods and processes of the various

ARCHITECTURAL DRAWING ROOM

building trades, as well as a considerable degree of skill in the use of tools, are all essential to the fullfillment of this purpose, and are therefore made prominent in the course of instruction.

### Methods of Instruction.

The principal lines of technical study take up the theory and practice of construction, the history and esthetics of architecture, architectural drawing as now practiced in offices, as well as the various modes of finishing drawings, the use of the architectural orders; and the usual routine and methods of office practice, so far as this can be successfully taught in a professional school.

This instruction is imparted by the study of text-books, with recitations and the solution of numerous special problems, also by lectures, as well as by the use of syllabuses instead of text-books, where suitable works do not yet exist. Engravings, photographs, models and sketches, are employed as illustrations.

Drawing is practiced during the entire course, and whenever possible, the student is required or encouraged to produce original designs. Opportunity is also afforded for two years' instruction in free hand drawing, modeling, water colors, designing, and sketching from nature.

Shop practice commences with the production of true plane surfaces in wood, and extends through joinery, cabinet work, turning, and veneering, to the making of models of architectural constructions to scale from drawings.

### Apparatus.

A collection of casts donated by the Spanish government, and another of casts of various architectural details from Lehr, of Berlin, belong to the departments of architecture and of design; models of ceilings, roof trusses, stairs and Schroeder's models of joints in wood-work and of construction in cut stone work, in the engineering museum.

The department of architecture also possesses a large and rapidly increasing collection of engravings and photographs illustrating the history of architecture and art, and their practical applications in all ages. The collection is mounted on about 10,000 cards, 11x14 inches, and is classified in two parts, one for the use of the class in history of architecture, the other for use by the various classes in designing; both series are minutely subdivided to facilitate easy reference, and are always open for free use, thus forming a most valuable working library. The plates issued by the most important American architectural journals are to be found here. This collection is placed in one of the architectural rooms.

The casts, photographs, etc., of the art gallery. In the University Library are many of the best English, German, French, and American architectural works and periodicals.

A large and well equipped carpenter and cabinet shop containing cabinet benches and sets of fine tools for classes in shop practice; foot and power lathes; machine saws, planers, molder, tenoner, shaper, jig saw, mortiser, boring machine, etc.

An architect's level, rod, and 100-foot steel tape.

A 5 x 7 folding kodak of latest pattern, fitted with roll holder, plate holders, and film carriers. An 8 x 10 bellows camera, with a Steinheil aplanatic, wide angle lens, for copying architectural views and interiors.

### Architectural Course.

#### FIRST YEAR.

1. Advanced Algebra; Elements of Draughting; Shop Practice; French, German, or English; Military.
2. Trigonometry; Descriptive Geometry and Lettering; Shop Practice; French, German, or English; Military.
3. Analytic Geometry; Advanced Descriptive Geometry; Shop Practice; French, German, or English; Military.

#### SECOND YEAR.

1. Differential Calculus; Wood Construction; Physics; Military.
2. Advanced Analytical Geometry; Stone, Brick, and Metal Construction; Physics; Military.
3. Integral Calculus; Sanitary Construction; Physics; Military.

#### THIRD YEAR.

1. Analytical Mechanics; Architectural Drawing; Chemistry; Themes and Elocution.
2. Resistance of Materials; History of Architecture; Architectural Drawing; Themes and Elocution.
3. Roofs; History of Architecture; Surveying; Themes and Elocution.

#### FOURTH YEAR.

1. Superintendence, Estimates, and Specifications; Architectural Perspective; Free Hand Drawing, or Modeling.
2. Heating and Ventilation; Architectural Design; Free Hand Drawing, or Water Colors; Thesis.
3. Esthetics of Architecture; Architectural Design; Free Hand Drawing, or Sketching; Thesis.

## ARCHITECTURAL ENGINEERING.

The especial purpose of this course of study is to qualify graduates for the profession of architecture, and particularly as architects, struc-

tural draughtsmen, and computers, as well as superintendents of construction. It is intended for those students preferring the mathematical and structural side of architecture to its artistic side, and for those who wish to acquire a thorough knowledge of iron and steel construction as it is now executed in architectural structures.

The course of study differs from that in architecture in the following particulars: Hydraulics and surveying are both required, the last being a single term study arranged for architectural students. Masonry construction, bridge analysis, and bridge designing, as taught to civil engineers, are taken instead of the second year of work in advanced free hand drawing, such as modeling, industrial design, and color design. A term of work in advanced graphics is also offered in lieu of architectural perspective. The remainder of the course of study is identical with that in architecture. The methods of imparting instruction are also similar, and are fully described elsewhere.

### Architectural Engineering Course.

#### FIRST YEAR.

1. Advanced Algebra; Elements of Draughting; Shop Practice; French, German, or English; Military.
2. Trigonometry; Descriptive Geometry and Lettering; Shop Practice; French, German, or English; Military.
3. Analytical Geometry; Advanced Descriptive Geometry; Shop Practice; French, German, or English; Military.

#### SECOND YEAR.

1. Differential Calculus; Wood Construction; Physics; Military.
2. Advanced Analytical Geometry; Stone, Brick, and Metal Construction; Physics; Military.
3. Integral Calculus; Sanitary Construction; Physics; Military.

#### THIRD YEAR.

1. Analytical Mechanics; Architectural Drawing; Chemistry; Themes and Elocution.
2. Resistance of Materials; History of Architecture; Architectural Drawing; Themes and Elocution.
3. Roofs; History of Architecture; Hydraulics; Themes and Elocution.

#### FOURTH YEAR.

1. Masonry Construction: Superintendence, Estimates, and Specifications; Architectural Perspective, or Advanced Graphics.
2. Bridge Analysis; Heating and Ventilation; Architectural Design; Thesis.
3. Bridge Design; Surveying; Architectural Design; Thesis.

# COLLEGE OF SCIENCE.

## SCHOOLS.

CHEMISTRY; NATURAL SCIENCE.

## FACULTY.

THOMAS J. BURRILL, PH.D., ACTING REGENT, Botany.
STEPHEN A. FORBES, PH.D., *Dean*, Zoölogy and Entomology.
CHARLES W. ROLFE, M.S., Geology.
ARTHUR W. PALMER, Sc.D., Chemistry.
SAMUEL W. PARR, M.S., Chemistry.
HOWARD S. BRODE, Assistant in Zoölogy.
ROBERT H. FORBES, B.S., First Assistant in Chemistry.
WILLIAM E. SANDFORD, PH.C., Second Assistant in Chemistry.
ALICE M. BARBER, B.S., Assistant in Botany.

## MEMBERS OF OTHER FACULTIES GIVING INSTRUCTION IN THIS COLLEGE.

EDWARD SNYDER, M.A., German.
JAMES D. CRAWFORD, M.A., History.
JAMES H. BROWNLEE, M.A., Rhetoric and Oratory.
FRANK F. FREDERICK, Industrial Art and Design.
ELBRIDGE R. HILLS, Captain U.S.A., Military Science.
M. R. PARADIS, M.A., French.
HERBERT J. BARTON, M.A., Latin.
DANIEL K. DODGE, PH.D., English Language and Literature.
GEORGE W. MYERS, M.L., Mathematics.
DANIEL W. SHEA, PH.D., Physics.
EDITH ADELAIDE SHATTUCK, Assistant in Industrial Art and Design.

# COLLEGE OF SCIENCE.

The College of Science affords an opportunity for the thorough study of the natural and physical sciences, either as specialties or as the substance of a liberal education. It is possible for the student to take a

year each (five exercises a week) in chemistry, physics, zoölogy, botany, and geology, with a considerable amount of language, literature, and general studies; or to concentrate his science work on one of several subjects; taking, for example, four years in chemistry or three years in either botany or zoölogy.

The main purpose of the courses in science is to give a liberal education based essentially upon a wide acquaintance with a considerable group of related sciences, or upon a more thorough knowledge of a smaller number leading to special pursuits. Access to the elective literary and historical subjects open to the student in these courses is conditioned only by a minimum requirement with respect to subjects more important to the immediate ends of the College of Science.

## COURSES OF INSTRUCTION.

### Chemistry.

Chemistry is taught in 15 courses of instruction. The regular four years' course required of students in the school of chemistry comprises courses 1 to 11, inclusive. Course 12 is for agricultural students taking two years of chemistry.

1. General and Experimental Chemistry.—This course is intended to serve as an introduction to the subject of chemistry and is directed chiefly to the fundamental and general principles of the science. The work of the term consists of illustrated lectures, recitations upon the subject matter of the lectures and upon text-book lessons, and of practice in the laboratory. The laboratory work, comprising a series of experiments illustrative of chemical principles and their applications, and involving a consideration of the properties of some of the more important elements and their compounds, serves in part as a preparation for the work of the class room. *Remsen's Introduction to Chemistry. Fall term, full study.* Professor Palmer.

2. Inorganic Chemistry.—This course is required of all chemical and pharmaceutical students. The tables of Meyer and Mendelejeff constitute the basis of the study. The various chemical principles and phenomena are so grouped and classified as to make their use in subsequent practice more intelligent and accurate. The work is from lectures and assigned text. *Remsen's Advanced Course. Winter and spring terms, half study.* Professor Parr.

   *Required:* Chemistry, 1.

3. Qualitative Analysis.—This course includes a systematic and experimental study of the metallic elements, their salts and compounds and their chemical formulæ and reactions, together with the principles which underlie qualitative analysis. The work is done chiefly in the laboratory and includes the determination of the basic and acid constituents of unknown substances. *Prescott and Johnston's Qualitative Analysis. Winter and spring terms, full study.* Professor PARR.
*Required:* Chemistry, 1.

4. Advanced Qualitative Analysis.—This course follows 3 and is a continuation of the determination of unknown substances covering more complicated compounds. Following this, further application, and to a large extent an original use, of the knowledge gained is made in the preparation and purification of typical salts and compounds from the spent material which accumulates in other lines of work throughout the laboratory. *Prescott and Johnston's Qualitative Analysis. Spring term, full study.* Professor PARR.
*Required:* Chemistry, 1, 2, 3.

5. Quantitative Analysis.—The work in this course occupies the fall term of the sophomore year. It begins with the analysis of salts of definite and known composition, the purpose being to gain facility and accuracy of manipulation together with a general knowledge of the principles involved in the best practice. The class room work is chiefly lectures and recitations upon assigned topics in *Fresenius's Quantitative Analysis. Fall term, full study.* Professor PARR.
*Required:* Chemistry, 1, 2, 3, 4.

6. Volumetric Analysis and Assaying.—In this course practice is given in the use of methods for special lines of work, including volumetric assays and analysis of ores and furnace products. This is followed by the electrolytic determination of copper, etc., and by the usual fire assays of lead, silver, and gold. The class room instruction in this term is mainly by lectures and special notes, the student being required to read assigned parts of the works of *Kerl, Mitchell, and others. Winter term, full study.* Professor PALMER.
*Required:* Chemistry, 1, 2, 3, 4, 5.

7. Agricultural Chemistry.—In this course lectures upon the chemistry of agriculture are given accompanied by laboratory work in the quantitative analysis of some of the materials employed in agriculture and agricultural products. The laboratory practice includes the analyses of complex silicates, as feldspar, mica, or glass, and of

commercial fertilizers, milk, and grain. *Spring term, full study.* Professor PALMER.

*Required:* Chemistry, 1, 2, 3, 4, 5.

8. Technological and Industrial Chemistry.—This course comprises a study of the best practice of iron and steel laboratories, test departments, etc., with special reference to rapid methods. It includes the technical analysis of pig iron and steels, paints and pigments, gas, etc. The class room work is chiefly devoted to the special applications of chemistry to the arts. Instruction is by lectures and recitations upon assigned topics in standard works of reference. *Wagner's Chemical Technology. Fall term, full study.* Professor PALMER.

*Required:* Chemistry, 1, 2, 3, 4, 5.

9. Organic Chemistry.—This course consists in a consideration of the principles and the processes of organic chemistry. The instruction comprises recitations, lectures, and laboratory practice. Bernthsen's Organic Chemistry is employed as a text-book, and is supplemented by lectures upon special topics and by references to the works of Richter, Roscoe and Schorlemmer, and Beilstein. In the laboratory the practice consists in the preparation of organic compounds, in accordance with the directions given in the text-book, with selections from the manuals of Levy and Fischer. Some time is also devoted to ultimate organic analysis. *Winter and spring terms, full study.* Professor PALMER.

*Required:* Chemistry, 1, 2.

10. Sanitary, Medical and Medico-Legal Chemistry.—This course includes such subjects as the sanitary examination of potable and mineral waters, urinalysis, toxicology, etc. During this course also subjects for original work in course 11 must be canvassed and a choice of themes made by the Thanksgiving recess, after which time and until the Holidays the work is of such a nature as to familiarize the student with the special methods and processes involved in the research contemplated and also with the bibliography of the subject. *Fall term, full study.* Professor PALMER.

*Required:* Chemistry, 1, 2, 3, 4, 5, 9.

11. Investigations and Thesis.—In this research work the student is required to make full use of the various sets of chemical journals, English, French, and German, as an essential means of extending his acquaintance with chemical literature and a drill in consultation of works of reference. It includes also the preparation of a thesis according to the rules laid down under "Degrees."

Throughout the course are lectures, and discussions on theoretical and thermo-chemistry, and in the history of chemistry. *Winter and spring terms, full study.* Professors PALMER and PARR.

*Required:* Chemistry, 1–10.

12. Agricultural Chemistry.—This course is arranged for agricultural students who elect two years of chemistry. It occupies the whole of the second year and is principally made up of (*a*) chemistry, 5; (*b*) chemistry, 9, winter term; (*c*) chemistry, 7. *Fall, winter, and spring terms, full study.* Professors PALMER and PARR.

*Required:* Chemistry, 1, 2, 3, 4.

*Note.* Agricultural students who elect three years of chemistry must pursue the courses in order as indicated for regular chemical students.

13. Assaying.—For students in mining engineering. The course in assaying consists of instruction by lectures and from text-books upon the ores, fuels, fluxes, furnaces, reagents, and chargers used in the fire assay of gold, silver, and lead ores. The laboratory practice includes daily use of the crucible and muffle furnaces and the manipulations connected with fire assaying. The rapid wet assay of copper and zinc ores is given in close connection with the course in fire assaying. Same as assaying in Chemistry 6. *Winter term, full study.* Professor PALMER.

*Required:* Chemistry, 1, 3, 4.

14. Metallurgy.—Especial attention is given to the effect of impurities in ores upon metallurgical processes and finished products. Fuels, refractory materials, and fluxes are described and their value and application explained. The known chemical reactions are expressed in equations; ore mixtures are calculated from analyses and experiments; and the size, construction, and working of furnaces are treated in accordance with modern practice. A series of models of furnaces and specimens of furnace material and products are used in illustration. The University is sufficiently near large and well conducted works smelting and refining iron, zinc, copper, silver, and lead for excursions to be made to them during the course. Instruction is given from text-books when possible, but great freedom in choosing material from later publications and from the present practice of actual plants is used in the supplementary lectures. *Greenwood's Steel and Iron; Peter's Modern American Methods of Copper Smelting. Spring term, full study.* Professor PARR.

*Required:* Chemistry, 1, 3, 4; Physics, 1.

15. Organic Analysis.—One term's work, mainly devoted to proximate analysis of organic compounds and mixtures of natural occurrence or of other origin. The work is both qualitative and quantitative and includes determinations of the more important alkaloids, carbohydrates, acids and other essential constituents of organic substances. *Dragendorff's Plant Analysis; Prescott's Organic Analysis; Allen's Commercial Organic Analysis. Spring term, full study (elective).* Professor PALMER.

*Required:* Chemistry, 1, 2, 3, 9.

PHARMACY.

1. Pharmacy.—History of pharmacopœias; chemical and galenical preparations; official standards of purity, etc. In the spring term pharmacognosy or the study of crude drugs, means of recognition, etc., in the hands of the student. *U. S. Pharmacopœia; U. S. and National Dispensatories; Remington's Practice of Pharmacy; Maisch's Organic Materia Medica; National Formulary. Fall, winter, and spring terms, full study.* Mr. SANDFORD.

2. Pharmacy.—Advanced pharmacy consisting of the study of dispensatories, classification and study of medicines, drugs, etc., doses, effects, etc. In the second term the study of prescriptions is taken up consisting of reading from actual files from the pharmacy; the study of incompatabilities and rules as to dispensing. In the third term a thorough course is given in compounding prescriptions at the prescription desk. Ample means are at hand for as practical a drill as is possible. *Fall, winter, and spring terms, full study.* Mr. SANDFORD.

MINERALOGY.

1. Mineralogy.—In the determination of minerals students work upon sets of unlabeled hand specimens. Familiarity with species and skill in applying the best and quickest methods of determination are attained by constant practice on a large number of specimens; and the lectures and other instruction acquaint students with the chemical composition and the schemes of classification. Especial attention is given to ores and rock-forming minerals. The lectures are extended to cover the whole series of minerals, but the time for laboratory practice is not sufficient to work on all. The succeeding term an opportunity is given to those who wish it for a continuation of laboratory practice, but credit will not be allowed unless especially granted. *Dana's Text-Book of Mineralogy. Fall term, full study.* Professor BALDWIN.

*Required:* Mathematics, 3, or 4; Chemistry, 1.

## Geology.

In the department of geology four courses are offered. For those students who wish more than a general acquaintance with the subject a major course of one year is provided, covering thirty-six weeks of class room and laboratory instruction; and a supplementary course of twenty-two weeks is offered to those who select a geological subject as a thesis. Engineers who wish an acquaintance with those portions only of the science which bear most directly on their future work are offered a minor course of eleven weeks. A minor course of eleven weeks is offered to those desiring merely an outline of the most prominent facts and theories of geology, with some ideas of the methods by which the geologist arrives at his conclusions.

1. Geology, Major Course.—(*a*) Dynamic Geology. The instruction given under this head is intended to familiarize the student with the forces now at work upon and within the earth's crust, modeling its reliefs, producing changes in the structure and composition of its rock masses, and making deposits of minerals and ores. A series of localities is studied in which great surface changes have recently taken place, with a view to ascertaining the character of the forces producing such changes, and the physical evidence of the action of like forces in the past. The subject is taught by lectures, and is abundantly illustrated by maps, models, charts, and views.

(*b*) Petrographic Geology. The instruction under this topic is given by lectures and laboratory work. The subjects included are the classification of rocks, the methods used in their determination, the conditions governing the formation of each species, the decompositions to which they are liable, and the products of these decompositions. Each student is supplied with a set of blowpipe tools and reagents and a series of hand specimens covering all the common species of rocks.

(*c*) Historical Geology. The work on this subject is substantially an introduction to the history of geology as a science, and the developmental history of the leading geological doctrines. An attempt is also made to trace the history of each geological period, so far as may be done with the data in hand.

(*d*) Paleontology. The scheme of instruction in this subject places before the student the classification adopted for those organic forms occurring as fossils, together with the succession of the various groups that occur in the strata, with the cause, as far as known, for

their appearance and disappearance. The student is required to familiarize himself with selected groups of paleozoic fossils, abundant illustrations of which are placed in his hands. The subject is presented in lectures and demonstrations, each group being considered in connection with its nearest living representative.

(*e*) Economic Geology. The final term of this course is devoted to a study of the uses man may make of geologic materials, the conditions under which these materials occur, and the qualities which render them valuable. The instruction is given by lectures, with references to the various state and government reports, transactions of societies, and monographs in which these subjects are treated, as well as by demonstrations with materials from the collections of the University.

In dynamic and historical geology Dana's Manual is used as a reference book. Petrography is pursued by means of a blue-print adaptation of Rosenbusch for the crystalline rocks, and various authors for the fragmental. In paleontology Nicholson and Zittel are used for descriptions of the larger groups, Miller, for general distribution, and the various state surveys for species. *Winter, spring, and fall terms, full study.* Professor ROLFE.

*Required:* Chemistry, 1; Physics, 1, or 2; Mineralogy, 1; Botany, 1, or 6; Zoölogy, 1, or 5.

2. Investigations and Thesis.—For students who select a geological thesis guidance and facilities will be afforded for individual investigations in the field and laboratory. *Winter and spring terms, full study.* Professor ROLFE.

*Required:* Geology, 1.

3. Engineering Geology.—It is the object of this course to bring together those parts of geology which will be of the greatest practical benefit to an engineer. The course will deal mainly with subjects connected with the origin, classification, and transformations of rocks, with the principles which govern the deposition and structure of rock masses; with the conditions under which the useful rocks and minerals occur, and the conditions which make them more or less valuable. The instruction is given by lectures and by demonstrations in the laboratory. *Winter term, full study.* Professor ROLFE.

4. General Geology, Minor Course.—This course includes a selection of such geological facts and theories as should be known to every intelligent person, with such discussion of them as the time will permit.

The subjects treated will be fully illustrated, and opportunity will be afforded for some study of rocks and fossils. *Spring term, full study.* Professor ROLFE.

### METEOROLOGY.

1. Meteorology.—The study of those atmospheric movements which bring our changes of weather, with their relations to heat, cold, electrical conditions, wind, cloud, barometric pressure, etc., constitutes the work of the first half of the fall term. Abercrombie's Weather is used as an introductory text book; but most of the instruction is given by lectures, the study of charts, and attempts by the student to forecast weather changes. *Fall term, half study.* Professor ROLFE.

   *Required:* Chemistry, 1; Physics, 1, or 2.

### BOTANY.

Six courses of instruction are offered in this subject—five primarily intended to meet the wants of students making botanical work more or less a specialty, and the sixth occupying a single term, complete in itself, for students whose chief attention is given to other branches. Three to eight terms' work constitute a major course; that of the single term, course 6, a minor course. To a very large extent natural objects are studied rather than books; but constant endeavor is made to introduce students to pertinent existing literature. In the laboratory much use is made of the compound microscope and special attention is given to its manipulation for best results, and to the preparation of objects.

1. Histology, Morphology, and Physiology.—This major course extends through one year, beginning in the fall. At first systematic studies are made upon specially difficult natural orders of flowering plants; as Compositæ, Cyperaceæ, and Gramineæ; with attention given to nomenclature and to the principles of classification. After vegetation has been destroyed by frost the remainder of the fall term is devoted to the histology of plants. Students make and study microscopical sections and other preparations, make micro-chemical tests, draw figures, and write descriptive notes. Lectures or text-book recitations occur about twice a week.

   The morphology and classification of special groups of plants, beginning with the lowest orders, constitute the work of the winter term. Compound microscopes are constantly in use, and the laboratory work is made the basis of instruction, variously aided and

extended by the study of the text-book and by lectures. Special attention is given to injurious fungi.

The third term is devoted to vegetable physiology and includes: the extent and causes of the movements of fluids in the tissues, the absorption of nutrient materials, respiration, transpiration, and assimilation; the causes, peculiarities, and results of growth; the relations and effects of external agencies, as heat, light, gravitation; self- and cross-fertilization; variation and heredity; movements and sensitiveness. The instruction is given by lectures and recitations, supplemented by required observations and experimental practice. *Bessey's Botany; Goebel's Outlines of Classification and Special Morphology; Vine's Lectures on Vegetable Physiology. Fall, winter, and spring terms, full study.* Professor BURRILL.

*Required:* Chemistry, 1; Art and Design, 4.

2. Bacteriology.—Bacteria and allied organisms are now known to play exceedingly important rôles in nature, and in the daily life and well being of man. This course is an introduction to existing knowledge upon the subject, and offers instruction in the modern methods of experimentation and research. The laboratory is well equipped for a limited number of students. Only those who can give extra time, when occasion demands, should undertake the work. Lectures and assigned reading accompany the laboratory work. *Fall term, full study.* Professor BURRILL.

*Required:* Botany, 1, or 6; Chemistry, 1; Art and Design, 4.

3. Systematic Botany.—There is offered in this course an opportunity for advanced work in special groups of cryptogamic plants to which an introduction is made in the winter term of course 1. The determination and classification of species and studies upon life histories largely occupy the time. The methods of bacteriology are used in the cultivation of fresh material. Students who propose to take the course should give notice of the fact at the beginning of the year or earlier, and should make collections for themselves. Laboratory work constitutes the principal part of the course. *Winter term, full study.* Professor BURRILL.

*Required:* Botany, 1, 2; Chemistry, 1; Art and Design, 4.

4. Plant Reproduction and Development.—Studies are made upon self- and cross-fertilization, embryology, and development, and upon special topics in physiology. Laboratory work supplemented by

lectures and assigned reading. *Strasburger's Practical Botany; Detmer's Pflanzenphysiologisches Prakticum. Spring term, full study.* Professor BURRILL.

*Required:* Botany, 1; Chemistry, 1; Art and Design, 4.

5. Investigations and Thesis.—Facilities are offered for original investigations upon selected subjects upon which may be based a thesis required for a degree. Special arrangements should be made with the instructor during the preceding year or at least not later than the beginning of the year in which the work is to be taken. *Laboratory work, full study.* Professor BURRILL.

*Required:* Botany, 1; Chemistry, 1; Art and Design, 4.

6. General Botany.—This minor course is offered to students who have but a single term of botanical study. An endeavor is made to present a general view of the science and to provide an introduction to modern methods of work. Lectures are given and two to four hours a week of laboratory field work are required. *Spring term, full study.* Miss BARBER.

## ZOÖLOGY.

Zoölogy is taught in five courses: (1) a major course (restricted elective) of a full year, two hours a day, primarily for students of natural science; (2) a term of embryology for those who have taken course 1; (3) two terms (senior) for those who have taken courses 1 and 2, and who select a zoölogical subject for the graduating thesis; (4) a year's work (open elective) in systemetic zoölogy, for advanced students only; and (5) a general course of single term, offered as a minor course in the school of natural science and as an elective to the students of the University at large.

1. General Zoölogy, Major Course.—It is the immediate object of this major elective course to make working zoölogists, and its secondary object is to draw from zoölogical science its distinctive discipline as an element in a liberal education. It is planned with a view to giving to students a wide acquaintance with the methods of zoölogical research in field, laboratory, and library, and a sound and accurate knowledge of zoölogical theory and of the leading facts of observation and experiment upon which such theory rests. The first practical work of the fall term (on the earthworm and on Hydra) is made an introduction to the special methods of the zoölogical laboratory. The remainder of the term is given to the Protozoa and Cœlenterata, the former of which are studied at length in the laboratory and lecture room in respect to their structure, physiology, and classification; their relations to plants; and

their relations to the organization, embryology, and developmental history of the higher animals. These subjects are used to elucidate and illustrate the general theory of zoölogy, which is here presented in outline, to be completed and filled in as the work of the course proceeds.

The second term is devoted to the morphology, physiology, and general classification of the remaining invertebrates, with principal attention to the Arthropoda. Early in this term a course of lectures on general embryology is given, with principal reference to the development of the earthworm as a type. The laboratory work includes the thorough study, by each member of the class, of an assigned species as a semi-independent investigation, the results of which are presented at the end of the term in a paper and drawings.

The third term's work is done on vertebrates, with principal attention in the laboratory to anatomical methods for the larger animals. The work of this term includes also a series of studies made by the class together upon the smaller aquatic animals of the neighborhood, taken as a biological group.

The important features of the method in this course are comparative dissections, descriptions, drawings, and microscopic preparations of types of the greater groups as a basis for the study of the subkingdoms and their more important divisions; lectures on the comparative physiology of selected forms, with especial reference to their relations to their environments, organic and inorganic, present and past; studies of the zoölogical classification, commonly introduced by analytical synopses, exhibiting the technical relations of groups, together with lectures and elaborate reviews directed especially to the general system of homologies by which zoölogical science is organized as a coherent whole. *Fall, winter, and spring terms, full study.* Professor FORBES.

*Required:* Chemistry, 1. Physiology, 1, must be taken with the first term's work of this course, if not before.

2. Embryology.— A course in practical and general embryology is given in the fall term as a sequel to course 1. It is required of all students intending to present a zoölogical thesis, except such as take course 4. It includes laboratory work upon the development of the chick, with assigned reading in general embryology for half a term, and an equal amount of reading on the evolution of animal life. *Fall term, full study.* Professor FORBES.

*Required:* Zoölogy, 1.

3. Investigations and Thesis.—Candidates for graduation in the College of Science who select a zoölogical subject as a thesis are required to spend at least two hours a day for the winter and spring terms of their senior year in making an independent investigation of some selected zoölogical subject. While this work is done under the general supervision of an instructor, it is in its methods and responsibilities essentially origiual work. *Winter and spring terms, full study.* Professor FORBES.

*Required:* Zoölogy, 1.

*Note.*—The texts most frequently used in the foregoing courses are Sedgwick's Claus, in general zoölogy, Haddon's Introduction to the Study of Embryology, and Foster and Balfour's Elements, in embryology. The dissections and other morphological studies are made with the aid of laboratory manuals prepared in the department and furnished to students in cyclostyle print. The determinative work of the course is guided by synopses, descriptive papers, and the like, also prepared in the laboratory and reproduced by the cyclostyle. A very full series of laboratory guides and manuals is at hand for reference.

4. Systematic Zoölogy (including Entomology).—To students who have course 1 an opportunity is offered for a year's work, two hours a day, in systematic zoölogy (including entomology), to be taken individually, under the guidance of an instructor. It may be closely adapted to the bent and ability of the student. It should consist essentially of determinative and descriptive work upon selected groups, and must be concluded with a synoptic or monographic paper upon some group of animals, based upon personal study.

For students of this course very unusual facilities are at hand in the library and collections of the State Laboratory of Natural History, which occupy rooms adjoining those of the zoölogical department of the University. *Fall, winter, and spring terms, full study.* Professor FORBES.

*Required:* Zoölogy, 1.

5. General Zoölogy, Minor Course.—For the benefit of students of natural science specializing in some other direction, as well as for literary students desiring some general knowledge of zoölogy, a course of a single term is offered which contains enough laboratory and descriptive work to give a practical idea of the method of zoölogical science, and a sufficient number of lectures, with study of text, to cover the general subject in a cursory manner. Principal attention is paid to the Protozoa, to insects, and to birds. *Winter term, full study.* Professor FORBES.

### Entomology.

1. General and Economic Entomology.—A single course is offered in this subject. It is designed mainly as a preparation for economic work and investigation as a specialty; but students whose principal interest is in structural or systematic entomology, may take a special line of such work in the second term.

A large part of the time is devoted to the study of the characters, life histories, habits, and economic relations of a selected list of especially important insects. Specimens of these in their different stages, together with synopses and descriptions of the families to which they belong, are furnished the students, and the essential facts not discoverable by direct observation are given in lectures or acquired by study of text.

Practice in field observation is given as opportunity offers, and all are taught the ordinary methods of the collection, preparation, and care of specimens, together with the approved methods of controlling the ravages of the injurious species.

A personal study, continuous for a term, of the life history and habits of some insect species is made by each student, and is finally reported in the form of a thesis.

In both field and laboratory an extraordinary opportunity is offered to competent students of this course to observe and assist in practical entomological work and original research. *Winter and spring terms, full study.* Professor Forbes.

*Required:* Zoölogy, 1, or 5; Botany, 1, or 6.

### Physiology.

1. Human Physiology.—The students admitted to this class have already passed an entrance examination in the elementary principles of anatomy and physiology.

The main objects of the course are to make the student familiar with the position, structure, and healthy action of those organs most liable to become diseased; to make plain the part which the nervous system plays in both the healthy and morbid action of the various organs, and in the problems of nutrition and energy.

The plan embraces lectures, recitations from the text-book, frequent readings from standard authors, and demonstrations from fresh dissections, alcoholic specimens, microscopical preparations, skeletons, and the manikin. *Martin's Human Body. Fall Term, full study.* Professor Rolfe.

*Required:* Chemistry, 1.

### General Biology.

1. General Advanced Biology.—For those who have taken a major course in either botany or zoölogy, a single term of general biology is arranged and especially commended. It is intended to review, extend, systematize, and unify the student's knowledge of the phenomena, the history, and the laws of life, and of the relations of plant and animal, of living and not living matter, and of biology to other sciences and to philosophy. It will be taught chiefly by lectures and by assigned reading. It is properly a senior study for students of the school of natural science. *Spring Term, full study.* Professor Forbes.

*Required:* Botany, 1, or Zoölogy, 1.

### Anthropology.

1. Anthropology.—The objects of this course are to summarize the facts and theories relating to the origin of man; to introduce the comparative study of races with a view to ascertaining their relations to each other and to primitive man; and to study the steps by which races change from the savage to the enlightened stage. The instruction is given by lectures, reading, and recitations. *Tylor's Anthropology. Fall term, half study.* Professor Rolfe.

The following subjects, offered to students in the College of Science, are described elsewhere, as noted:

In the College of Agriculture—
Veterinary Science, 3.

In the College of Engineering—
Mathematics, 1, 3, 5; Astronomy, 1; Physics, 1, 2; Electrical Engineering, 1.

In College of Literature—
Philosophy, 1, 2, 4; Pedagogy, 1 to 6; History, 1, 2, 4; French, 4, or 1, 2; German, 1, 4; Political Economy, 1; English Literature, 5; Rhetoric and Oratory, 1.

In School of Military Science—
Military Science, 1, 2.

In School of Art and Design—
Art and Design, 4.

## SCHOOL OF CHEMISTRY.

The aim of the instruction in this school is to impart such a knowledge of chemistry as will enable the student to apply the principles of the science to the work of the druggist, pharmacist, and practical chemist, as

well as to investigations of chemical problems and to original research. The scope of the work is sufficiently broad to enable the student to specialize in the various callings open to the chemist and pharmacist. For the first three years specific courses are arranged, but much of the laboratory work of these courses may be varied to suit the purposes or the needs of the individual student. The fourth year is mainly occupied with investigation along special lines, the subject being chosen under the direction and with the advice of the professor in charge, with particular reference to the student's aims.

Students, not members of the College of Science, who desire to pursue studies in the chemistry of agriculture, or in metallurgy, may have ample opportunity for such work on consultation with the professor in charge.

### Chemical Laboratories.

A building 75 x 120 feet, and four stories in height, is devoted to chemistry. The basement contains a furnace room for assaying provided with crucible and muffle furnaces, and a large store room for chemicals and apparatus. The first story contains a lecture room capable of seating 200 persons, and a laboratory for practice in general experimental chemistry and qualitative analysis, large enough to accommodate 152 students; 128 desks are now fitted up, each having an evaporating hood, gas, and water. There are a spectroscope table, a blowpipe table, and a store room stocked with apparatus and chemicals. Also, a good sized room fitted for the preparation of lecture experiments, and for storing apparatus, etc. The second story, designed for the use of advauced students, has the following apartments: A lecture room, a large laboratory for quantitative analysis and general advanced work, now containing 64 desks; a large well lighted balance room, containing analytical balances of the best European and American make; a pharmacy furnished with drugs and pharmaceutical preparations; a private laboratory for instructors; and a gas analysis room entirely cut off from the system of heating, in order to avoid fluctuations of temperature. The laboratories are amply supplied with stocks of chemicals and apparatus of the most approved description and quality, for the work in the various brauches of the science.

### Classification of Subjects and Requirements for Graduation.

Forty-one credits for full terms of work, thirty-two of which shall be taken from the following list of required subjects, including military,

QUALITATIVE LABORATORY.

are required for graduation from the chemical courses. For the nine remaining credits five subjects must be chosen from the restricted electives and the others may be taken from these or from the open electives.

REQUIRED STUDIES.

Chemistry (1 to 11), 13 credits.
German (1, 2), 5 credits.
French (4), 3 credits.
Mathematics (1, 3), 2 credits.
Physics (1), 3 credits.
Philosophy (1), 1 credit.
Mineralogy, 1 credit.
Military, 2 credits.
Rhetoric and Oratory (1), 2 credits.

RESTRICTED ELECTIVES.

Botany (6 or 1), 1 or 3 credits.
Zoölogy (5 or 1), 1 or 3 credits.
Geology (4 or 1), 1 or 3 credits.
Physiology, 1 credit.
Political Economy, 1 credit.
Philosophy (2, 4), 2 credits.
History (4), 1 credit.

OPEN ELECTIVES.

Chemistry (advanced work), 3 credits.
Electrical Engineering (1), 1 credit.
English Literature (5), 3 credits.
German, 1 credit.
Bacteriology, 1 credit.
Mathematics (5, or 6, 7), 4 credits.
Materia Medica, 3 credits.
Metallurgy, 1 credit.
Art and Design (5), 1 credit.
Pedagogy (1 to 6), 3 credits.
Astronomy (4), 1 credit.

## COURSES OF STUDY.

### Chemical Course.

#### FIRST YEAR.

1. General Chemistry (1); Advanced Algebra; French; Military.
2. Inorganic Chemistry (2); Qualitative Analysis (3); Trigonometry; French; Military.
3. Inorganic Chemistry (2); Qualitative Analysis (4); Mathematics, or Botany (6); French; Military.

#### SECOND YEAR.

1. Quantitative Analysis (5); Physics; German; Military.
2. Volumetric Analysis and Assaying (6); Physics; German; Military.
3. Agricultural Chemistry (7); Physics; German; Military.

#### THIRD YEAR.

1. Technological Chemistry (8); Mineralogy; German; Themes and Elocution.
2. Organic Chemistry (9); Geology, etc., (one elective); German; Themes and Elocution.
3. Organic Chemistry (9); Geology, etc. (two electives); Themes and Elocution.

BALANCE ROOM.

FOURTH YEAR.

1. Sanitary Chemistry (10); Geology, etc. (two electives.)
2. Research and Thesis (11); Chemistry, etc. (two electives.)
3 Research and Thesis (11); Chemistry, etc. (two electives.)

### Two Years' Course in Pharmacy.

[Not leading to a degree.]

FIRST YEAR.

1. General Chemistry (1); Pharmacy (1); Botany (1); Military.
2. Qualitative Analysis (3); Pharmacy (1); Botany (1); Military.
3. Qualitative Analysis (4); Pharmacy (1); Botany (1); Military.

SECOND YEAR.

1. Quantitative Analysis; Pharmacy (2); Physiology; Military.
2. Organic Chemistry; Pharmacy (2); Materia Medica; Military.
3. Organic Analysis; Pharmacy (2); Materia Medica; Military.

By an earnest prosecution of the studies laid out in this course the student may thoroughly prepare himself for the examinations required by the State Board of Pharmacy for registration as pharmacists.

The work outlined above leaves no time during the college year for the drug store practice required by law for a registered pharmacist. This practice must therefore be had at other times.

## SCHOOL OF NATURAL SCIENCE.

The courses in the school of natural science are especially intended to provide a general preparation for professions and business pursuits requiring more of an acquaintance with the methods and facts of science than with those of literature. More specifically they are designed:

(1) To afford a thorough and liberal education with a basis in science and the modern languages.

(2) To prepare for the pursuit of specialties in zoölogy, entomology, botany, general biology, and geology, as a scientific career.

(3) To lay a liberal foundation in biological work and study for a course of medicine.

(4) To prepare for the teaching of the natural and physical sciences, either in the higher schools or as a professional specialty.

### Natural History Hall.

The natural science building erected in 1892, at a cost of $72,000, is 94 feet in width by 134 feet in length, and two stories in height,

NATURAL HISTORY HALL

besides basement and attic. There is a spacious, well lighted, central hall, around which, on all sides, are situated laboratory, lecture, and subsidiary rooms, all lighted by an abundance of windows spaced for the best results. On the main floors there are eight laboratories for students' work and four for the professors' private use, four lecture halls, as many office rooms, and the requisite number of cloak rooms and closets. The basement and attic give abundance of room for storage and work, and may be used for laboratory purposes.

The building is occupied by the departments of botany, zoölogy, physiology, mineralogy, and geology. The laboratories for these subjects have extensive equipments and give excellent opportunity for the best instruction and practical work. With these superior quarters and advantages the instruction in natural science will be still more prominent than heretofore in this rapidly growing work of the University. Present provision is also made in the building for the State Laboratory of Natural History, for the office of the State Entomologist, and for the office of the Agricultural Experiment Station.

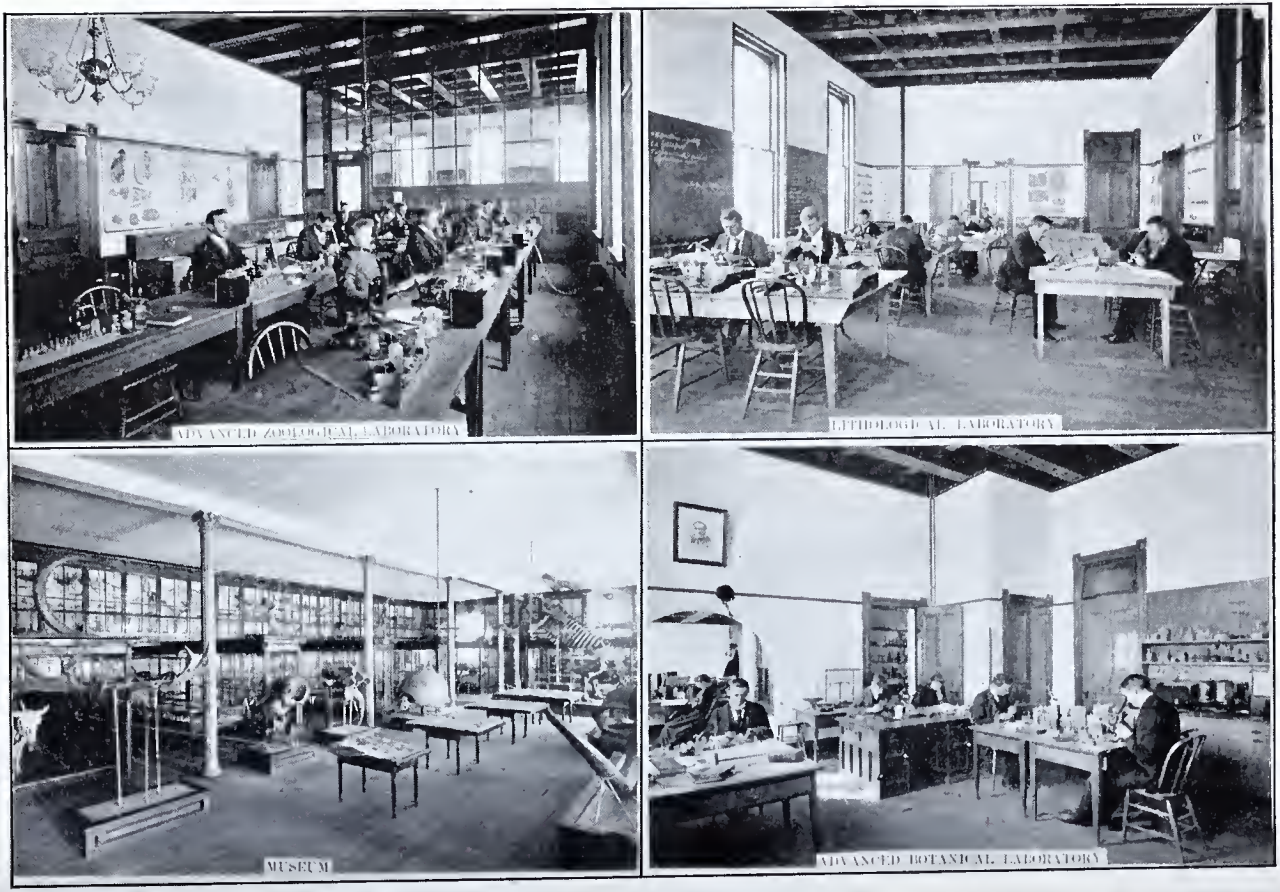
## Classification of Subjects and Requirements for Graduates.

The studies offered in this school are divided into three groups: (1) required studies, (2) restricted electives, and (3) open electives. Under the head of restricted electives both major and minor courses are given, the former the maximum offering and the latter the minimum requirement in their respective subjects.

No student may graduate from the school of natural science until he has completed all required courses as given in group 1, and has done at least nine terms' work on one major subject, or twelve terms' work on more than one from group 2; and taken at least minor courses in all the other subjects of this group in which such courses are offered. He must further have received forty full-term credits (including military) for University studies.

### GROUP I. REQUIRED SUBJECTS.

French (4, or 1), 3 credits.
German (1, 4), 5 credits.
Mathematics (1, 3), 2 credits.
Art and Design (4), 2 credits.
Rhetoric and Oratory (1), 2 credits.
History (4), or Political Economy (1), 1 credit.
Philosophy (1, or 3), 1 credit.
Military Science (1, 2), 2 credits.



ADVANCED ZOOLOGICAL LABORATORY

LITHOLOGICAL LABORATORY

MUSEUM

ADVANCED BOTANICAL LABORATORY

GROUP 2. RESTRICTED ELECTIVES.

| MAJOR COURSES. | MINOR COURSES. |
|---|---|
| Botany (1 to 5) 3, 6, or 9 credits. | Botany (6), 1 credit. |
| Zoölogy (1 to 4), 3, 6, or 9 credits. | Zoölogy (5), 1 credit. |
| General Biology, 1 credit. | Physiology, 1 credit. |
| Entomology, 2 credits. | Geology (4), 1 credit. |
| Mineralogy, 1 credit. | Physics (2), 1 credit. |
| Geology (1, 2), 3 or 5 credits. | Chemistry (1), 1 credit. |
| Physics (1), 3 credits. | |
| Chemistry (6, or 1 to 3), 3 or 6 credits. | |

GROUP 3. OPEN ELECTIVES.

| | |
|---|---|
| French (2), 3 credits. | Descriptive Astronomy (1), 1 credit. |
| English Literature (5), 3 credits. | Meteorology, ½ credit. |
| German (5), 1 credit. | Political Economy, 1 credit. |
| History (1 to 4), 4 credits. | Pedagogy (1 to 6), 5 credits. |
| Entomology, 2 credits. | Philosophy (2, 4), 2 credits. |
| Anthropology, ½ credit. | Mathematics, 1 credit. |

## Suggested Courses of Study.

The following arrangement of studies in definite courses is presented as an aid to election by students. The work of the freshman year must be taken in some one of these courses, but beyond this they have no binding force.

### GENERAL COURSE IN BIOLOGY.

Students desiring uniform major courses in the biological subjects, with a maximum amount of the related sciences and the modern languages, are advised to take substantially the following course. It is recognized by the Illinois State Board of Health as the equivalent of one year's study in a three years' medical course, or of two years' medical study and one course of lectures in a four years' course in medicine.

#### FIRST YEAR.

1. Chemistry; Advanced Algebra; Physiology; Military.
2. Chemistry; Trigonometry; Drawing; Military.
3. Chemistry; Astronomy, or Mathematics; Drawing; Military.

#### SECOND YEAR.

1. Botany; Physics; French; Military.
2. Botany; Physics; French; Military.
3. Botany; Physics; French; Military.

THIRD YEAR.

1. Zoölogy; Mineralogy; German; Themes and Elocution.
2. Zoölogy; Geology; German; Themes and Elocution.
3. Zoölogy; Geology; German; Themes and Elocution.

FOURTH YEAR.

1. Embryology; Geology; German.
2. Thesis; Logic; German.
3. Thesis; Political Economy; General Biology.

SPECIAL BIOLOGICAL COURSES.

Courses in botany and zoölogy are offered those wishing to specialize early in either of these sciences, and to avail themselves fully of all the resources of the University in the major subject chosen.

COURSE IN BOTANY.

FIRST YEAR.

1. Chemistry; French; Advanced Algebra; Military.
2. Drawing; French; Trigonometry; Military.
3. Drawing; French; Astronomy, or Mathematics; Military.

SECOND YEAR.

1. Botany; Physiology; German; Military.
2. Botany; Physics; German; Military.
3. Botany; Physics; German; Military.

THIRD YEAR.

1. Botany; History; German; Themes and Elocution.
2. Botany; History; German; Themes and Elocution.
3. Botany; History; Geology; Themes and Elocution.

FOURTH YEAR.

1. Anthropology and Meteorology; Psychology; History of Civilization.
2. Botany (Thesis); Logic; Experimental Psychology.
3 Botany (Thesis); Political Economy; General Biology.

COURSE IN ZOÖLOGY.

FIRST YEAR.

1. Chemistry; French; Advanced Algebra; Military.
2. Drawing; French; Trigonometry; Military.
3. Drawing; French; Botany; Military.

SECOND YEAR.

1. Zoölogy; Physiology; German; Military.
2. Zoölogy; Physics; German; Military.
3. Zoölogy; Astronomy; German; Military.

THIRD YEAR.

1. Zoölogy; History; German; Themes and Elocution.
2. Zoölogy; History; German; Themes and Elocution.
3. Zoölogy; History; Geology; Themes and Elocution.

FOURTH YEAR.

1. Anthropology and Meteorology; Psychology; History of Civilization.
2. Zoölogy (Thesis); Logic; Experimental Psychology.
3. Zoölogy (Thesis); Political Economy; General Biology.

### Science Teachers' Courses.

Those who wish to fit themselves especially for teaching zoölogy, botany and geology, in high schools, academies, seminaries, and the like, may advantageously substitute some of the pedagogical subjects of the course in philosophy and pedagogy, for German, logic and political economy in the above general course in biology.

Similarly, pedagogical subjects may be elected by those taking special botanical or zoölogical courses and wishing to prepare for the teaching of botany or zoölogy as a specialty.

For those desiring to qualify themselves in physics and chemistry with special reference to teaching, six terms' work in chemistry, three in physics, and six in pedagogy are offered.

### Course Preparatory to Medicine.

For students intending to study medicine, and not wishing to take a full biological course, a two years' course is offered, not leading to a degree. Some knowledge of Latin is very desirable.

# COLLEGE OF LITERATURE.

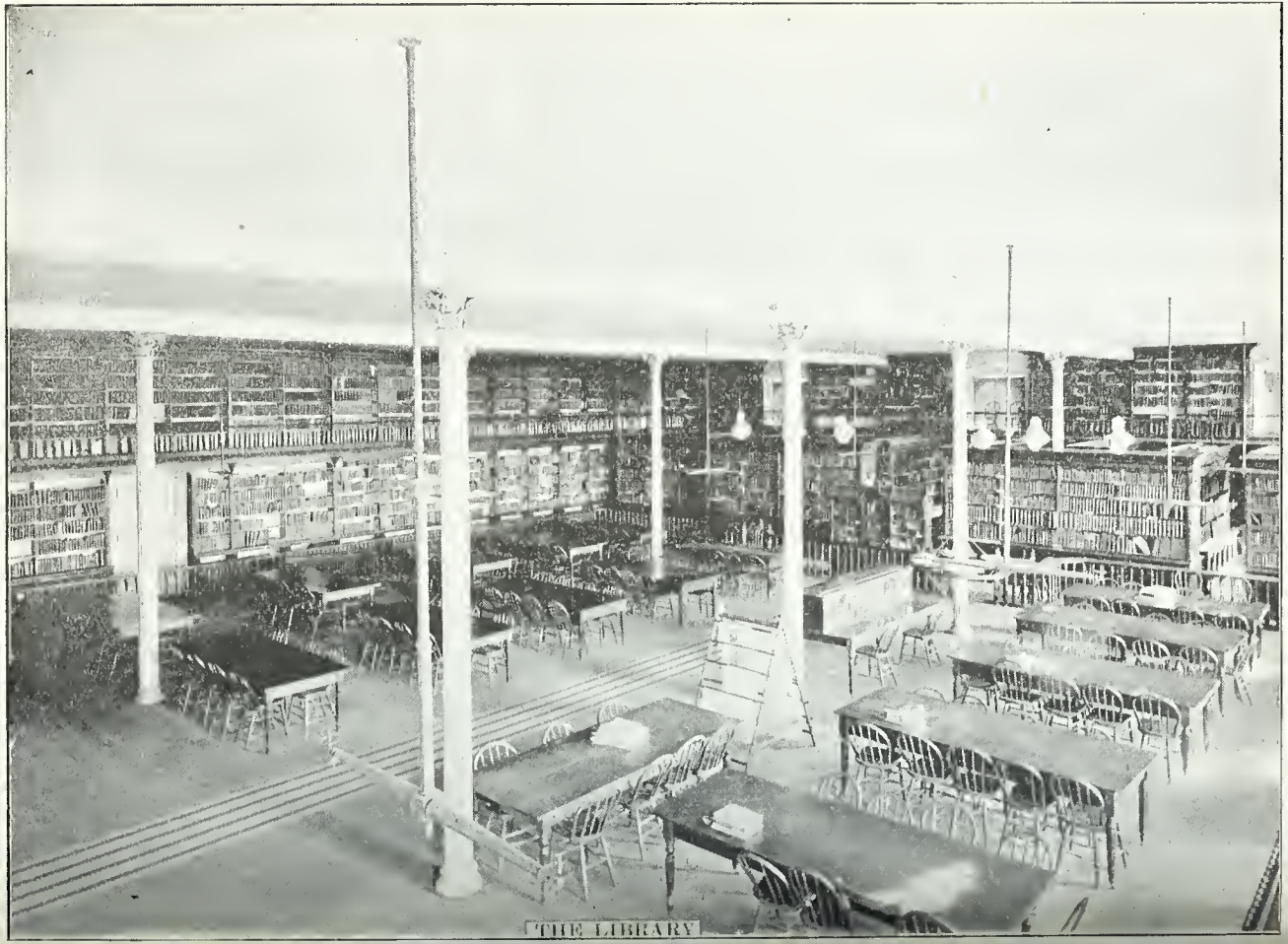
SCHOOL OF ENGLISH AND MODERN LANGUAGES; SCHOOL OF ANCIENT LANGUAGES; SCHOOL OF PHILOSOPHY AND PEDAGOGY.

## FACULTY.

THOMAS J. BURRILL, PH.D., ACTING REGENT, Botany.
EDWARD SNYDER, M.A., *Dean*, German.
JAMES D. CRAWFORD, M.A., History.
JAMES H. BROWNLEE, M.A., Rhetoric and Oratory.
FRANK F. FREDERICK, Industrial Art and Design.
ELBRIDGE R. HILLS, Captain U.S.A., Military Science.
HERBERT J. BARTON, M.A., Latin.
M. R. PARADIS, M.A., French.
CHARLES M. MOSS, M.A., Ph.D., Greek.
DANIEL K. DODGE, M.A., Ph.D., English Language and Literature.
KATHARINE MERRILL, B.A., English Language and Literature.
WILLIAM O. KROHN, Ph.D., Psychology and Pedagogy.
HERMAN S PIATT, B.A., Assistant in German and French.

## MEMBERS OF OTHER FACULTIES GIVING INSTRUCTION IN THIS COLLEGE.

SAMUEL W. SHATTUCK, C.E., Mathematics.
STEPHEN A. FORBES, PH.D., Zoölogy.
CHARLES W. ROLFE, M.S., Geology.
ARTHUR W. PALMER, SC.D., Chemistry.
SAMUEL W. PARR, M.S., Chemistry.
GEORGE W. MYERS, M.L., Mathematics.
DANIEL W. SHEA, PH.D., Physics.



THE LIBRARY

# COLLEGE OF LITERATURE.

The object of the courses in this College is to furnish a sound and liberal education to fit students for the general duties of life, and especially to prepare them for those professions and pursuits which require a large measure of literary and scientific knowledge and training. They meet the wants of those who wish to prepare themselves for the labors of the press as editors and publishers, for teachers in the higher institutions, or for the transaction of public business.

## Instruction.

The plan of instruction embraces, besides the ordinary text-book study, lectures and practical exercises in all the departments, including original research, essays, criticism, and other work intended to illustrate the studies pursued, and to exercise the student's own powers.

A prominent aim will be to teach the right use of books, and thus to prepare the students for self-directed investigation and study, which will extend beyond the curriculum of his school and the period of his graduation. With this view, constant use of the already large and continually enlarging stores of the library will be required and encouraged.

The library is well supplied with works on history, philosophy, political science, and pedagogy, also on English, American, French, German, and classic literature. It contains at present over twenty-three thousand well selected volumes, and is constantly growing by purchase at home and abroad. Valuable American and foreign periodicals are received regularly in the reading room.

## COURSES OF INSTRUCTION.

### Philosophy.

[The courses in Philosophy are open to such students only as have completed at least two years of University work.]

1. Psychology.—In this course are considered the more general problems of the mental life of the normal individual, especially those that have a living interest for the student, and find illustration in his every day life. Among the large number of topics discussed the following are the chief: sensation, relation of mental activity to bodily changes, habit, attention, memory, imagination, association of ideas, reasoning, emotion, instinct, will, localization of cerebral functions, dreams, illusions, hypnotism, and time relations of mental phenomena. The

course is fully illustrated at difficult points by the use of apparatus, charts, and photographs sufficient to acquaint the class with the more modern methods of psychological investigations. Endeavor is made to give the class, in the form of lectures or otherwise, the more important results of recent researches. A considerable number of new reference books have been purchased, and all the important psychological journals are taken. *James's Psychology* (*Briefer Course*). *Fall term, full study.* Assistant Professor KROHN.

2. Logic.—This course embraces both inductive and deductive logic. The aim of the course is to make the principles of logic practical—to assist the student to employ correct methods in his thinking as well as in all his literary and scientific investigations. The following are some of the topics discussed: Principles of logic, conditions of valid thinking, forms of arguments, fallacies both formal and material, the scientific method, quantitative induction, the conditions of correct observation, meauing of explanation; the *rationale* of experiment, and criticism of arguments. Text-book and lectures. *Winter term, full study.* Assistant Professor KROHN.

3. History of Philosophy.—Lectures discussing general questions of philosophy constitute the first part of the course. These are followed by lectures based on Zeller's Outlines of Greek Philosophy, and Burt's and Schwegler's histories of modern philosophy. Special attention is given to the problems in philosophy that have arisen since the time of Kant, and to the views of Herbert Spencer. A large number of good reference works are accessible. *Spring term, full study.* Assistant Professor KROHN.

*Required:* Philosopy, 1.

4. Ethics.—This course embraces both a survey of the principles of ethics and a setting forth of the most significant distinctions of practical morality. A brief review is made of the principal theories current in ethics and the basis of their claim on the individual is carefully examined. The real purpose of the course is to bring out the psychological basis of moral relations, and to lay a foundation in the student's own mind for systematic thinking on ethical questions. The seminary method is introduced to a considerable extent and such subjects as freedom of the will, commercial ethics, and the moral spirit of Shakspere, are discussed. *Winter term, full study.* Assistant Professor KROHN.

*Required:* Philosophy, 1.

6. Experimental Psychology.—This course is made up of lectures and laboratory work with assigned reading. Experiments are made illustrating the time measurements of mental phenomena, the influence of the body upon the mind, and of the mind upon the body, and the psychical elements in sensations. Also an extended investigation into dreams, and allied phenomena.

A psychological laboratory is projected, and considerable apparatus already purchased and set up in working order. *Winter term, full study.* Assistant Professor KROHN.

*Required*: Philosophy, 1.

PEDAGOGY.

1. Educational Psychology.—In this course application is made to educational methods of the conclusions gained from the study of general psychology. A study is made of the child's mind, with especial reference to its content on entering school, and it is sought to discover the laws and principles according to which it unfolds and develops. An examination of the influences of each of the various studies upon mental growth is made. The methods of making practical school tests, by means of which the mental growth of school children is determined, are explained and illustrated. Original work is encouraged. This course is especially adapted to teachers, and is of value in that it enables one to frame, upon a rational basis, the curriculum of study. *Sully's Teachers' Hand-book of Psychology, and Lectures. Fall term, full study.* Assistant Professor KROHN.

2. School Hygiene.—The aim of this course is entirely practical. The endeavor is to enlighten those taking the course upon the best methods to be pursued with reference to the following points pertaining to school buildings: location, soil, elevation, and surroundings; form of structure, ventilation, heating, lighting, plumbing; equipment, especially furniture; play grounds and apparatus for physical exercise. The course will be illustrated with views of school buildings that are more or less perfect in their hygienic arrangements and visits to school houses will be made from time to time. Lectures and assigned reading. *Winter term, full study.* Assistant Professor KROHN.

3. Philosophy of Education.—In this course portions of Bain's Education as a Science, Spencer's Education, and Rosencranz's Philosophy of Education will be used as a basis supplemented with lectures. *Spring Term, Half Study.* Assistant Professor KROHN.

4. History of Education.—An historical and comparative study is made of educational methods of the Greeks, Chinese, Hebrews, and Egyptians; the work of the modern educational reformers, such as Comenius, Rousseau, Pestalozzi, Herbart, Bain, and Spencer, receives especial attention; and the present educational system of our own country is compared with that of France, Switzerland, Germany, and Russia. *Winter term, half study.* Assistant Professor KROHN.

5. School Supervision.—Historical view of school supervision in the United States; character of school supervision; state, county, and city supervision; the city superintendent of schools, his relation to pupils, to teachers; gradation and course of study; promotions; relation of superintendent to parents, to physical and moral training of pupils, to government and discipline; his relation to the board of education, to agencies for the improvement of teachers. *Fall term, full study.* Assistant Professor KROHN.

6. Pedagogical Seminary.—This is conducted in a somewhat informal manner. The discussions are based upon articles in the current numbers of such magazines, as the Educational Review, Academy, Pedagogical Seminary, and School Review. *Spring term, half study.* Assistant Professor KROHN.

Open only to students who have taken two of the other pedagogical courses above outlined.

### POLITICAL ECONOMY.

1. Political Economy.—At present a single term's work is given in this subject, devoted to the study of standard text-books and to assigned reading. *Spring term, full study.* Professor CRAWFORD.

*Required:* Two years of University work.

### HISTORY.

The study of history extends through the junior and senior years and includes general history, the history of civilization, and the history of the English and United States constitutions. The work of the two years is intended to be continuous, each term being helped by the one preceding; but the study of the constitutional history of the United States is arranged separately for students who have not had the course in general history. The work of the course is presented by text-books, topics, and lectures, and it is desired that students should obtain a considerable acquaintance with historical writers as well as facts.

1. General History.—Three terms are given to general history (some previous knowledge of the subject being assumed), in tracing the outlines of the world's progress from the first appearance of civilization. The work is intended to be much more than an outline, however, and cause and effect, the philosophy of history, are carefully looked to as preparing the way for the special study of the history of civilization which follows. *Fall, winter, and spring terms, full study.* Professor CRAWFORD.

2. History of Civilization.—In this subject the early state of mankind and the history of progress from that state on through the Greek and Roman periods is presented in lectures, followed by a consideration of the civilization of modern Europe on the basis of Guizot's Lectures. References are made to a considerable range of literature, and essays on various topics are required. *Fall term, full study.* Professor CRAWFORD.

   *Required:* History, 1.

3. Constitutional History.—In the first term the time is given to an historical study of the English constitution with special reference to principles and precedents belonging equally to modern England and the United States. In the second term an historical and critical study is made of the constitution of the United States. *Winter and spring terms, full study.* Professor CRAWFORD.

   *Required:* History, 1.

4. Constitutional History.—For students who have not had the work in general history, a term is arranged giving a brief sketch of the principles of English government, and a study of the constitution of the United States. *Winter term, full study.* Professor CRAWFORD.

## THE CLASSICS.

The purpose of the instruction in this department may be stated as follows: First, to acquaint the student with the principles of the languages themselves. Much stress is laid upon the fact that the laws of syntax are the laws of mental operation, and that a proper regard for the logical order of thought must lend help to translation. Extemporaneous translations are required throughout the course as furnishing the most available application, under the stimulus of the class room, of the purpose enunciated. A second purpose is to employ the literature read as a basis for the consideration of those numerous problems of life and civilization which the Greeks and Romans attempted to solve. The debt of

present civilization to the classic world is so large and so varied that abundant opportunity is afforded for a fruitful study of the growth and descent of ideas and institutions. Conversations upon the governmental, moral, educational, and esthetic ideas of the ancients are used to elucidate these questions, and students are required to use the library, and the numerous photographs and other apparatus of instruction that are at their command for further information in special work to be assigned from time to time.

The two purposes are, then, to deal rationally with language as language, and to make this study a fruitful source of information upon questions that must concern every thoughtful person.

GREEK.

1. Selections from Herodotus.—Special studies in verb syntax. Ionic etymology. Greek prose. *Mather. Fall term, full study.* Professor Moss.

2. Selections from Xenophon's Hellenica.—Studies in syntax. Greek prose. Consideration of the causes of the downfall of Athens. *Manatt. Winter term, full study.* Professor Moss.
   *Required:* Greek, 1.

3. Xenophon's Memorabilia.—Studies in syntax. Consideration of the work of Socrates as a public teacher. *Winans. Spring term, full study.* Professor Moss.
   *Required:* Greek, 1, 2.

4. Selections from the Orations of Lysias and Demosthenes.—Comparative study of the syntax of the two authors. Discussions upon the development of Greek oratory. *Stevens; Tyler; Tarbell. Fall term, full study.* Professor Moss.
   *Required:* Greek, 1, 2, 3.

5. Plato's Apology; and Selections from the Phaedo.—Studies in the rhetoric and idiom of Plato. Outline of his philosophical views, so far as touched upon in the text read. *Wagner. Winter term, full study.* Professor Moss.
   *Required:* Greek, 1, 2, 3, 4.

6. Aeschylus's Prometheus Bound, and Euripides' Alcestis.—Studies in the history and characteristics of the Greek drama. *Prickard; Jerram. Spring term, full study.* Professor Moss.
   *Required:* Greek, 1, 2, 3, 4, 5.

7. Lyric Poets.—Studies in the social character of lyric poetry. *Bucholz. Fall term, full study.* Professor Moss.
   *Required:* Greek, 1, 2, 3, 4, 5, 6.

8. Seminary.—Thucydides. Papers on historical, economical, and civil questions connected with the rise of the Athenian power. *Winter term, full study.* Professor Moss.
   *Required:* Greek, 1, 2, 3, 4, 5, 6, 7.

9. Seminary.—Homer. Papers on the civilization represented in the poems. Lectures on the interpretive character of the Illiad and Odyssy. *Spring term, full study.* Professor Moss.
   *Required:* Greek, 1, 2, 3, 4, 5, 6, 7, 8.

## LATIN.

1 (a) Livy.—Selections from the XXI. and XXII. books. A study of Hannibal and of the military systems of the times. A thorough review of syntax, with a careful study of subjunctives.
   (b) Prose Composition.—The work is based on Livy, and that author's text in representative passages is made the subject of careful analysis. The writing is based on this analysis. *Fall term, full study.* Professor BARTON.

2. Cicero de Amicitia.—An introduction is here made to the philosophical systems of the Romans. *Winter term, full study.* Professor BARTON.
   *Required:* Latin, 1.

3. Horace. Selections from the Odes.—The metres are carefully studied. The selections are designed to bring into prominence the beauty of the poet. *Spring term, full study.* Professor BARTON.
   *Required:* Latin, 1, 2.

4. Tusculan Disputations.—The first book of the Disputations is read together with extracts from Cato Major, de Senectute, and Scipio's Dream. *Fall term, full study.* Professor BARTON.
   *Required:* Latin, 1, 2, 3.

5. Horace's Satires. Selections.—A careful study is made of the social life of the Romans. *Winter term, full study.* Professor BARTON.
   *Required:* Latin, 1, 2, 3.

6. Tacitus. The Germania and Agricola. Roman Archaeology.—*Spring term, full study.* Professor BARTON.
   *Required:* Latin, 1, 2, 3.

7. Quintilian.—Selections from the X. and XII. books. The whole field of classical literature is studied and reviewed. *Fall term, full study.* Professor BARTON.
*Required:* Latin, 1, 2, 3.

8. Juvenal's Satires.—Especial reference to the private life of the Romans. *Winter term, full study.* Professor BARTON.
*Required:* Latin, 1, 2, 3.

9. Cicero de Officiis.—In this connection a study of the ethics of the Roman world. *Spring term, full study.* Professor BARTON.
*Required:* Latin, 1, 2, 3.

## ENGLISH LANGUAGE AND LITERATURE.

The work of this department during the first two years consists of the study of the literature, with the exception of one hour a week in the freshman year devoted to higher English grammar. During the last two years the time is divided between literature and language. English 1 and 2 are required for the degree of B. L.

A special course in literature of one year, is offered to scientific and engineering students.

1. (*a*) General Survey of English Literature.—Four hours a week. (*b*) Higher English Grammar. One hour a week. *Fall, winter, and spring terms, full study.* Assistant Professor MERRILL.

2. Shakspere.—Two hours a week. Professor DODGE. History of the Drama. One hour a week. Professor DODGE. Prose writers from Johnson to Ruskin. Two hours a week. *Fall, winter, and spring terms, full study.* Assistant Professor MERRILL.
*Required:* English, 1.

3. Poetry of the 19th centnry. — Two hours a week. Assistant Professor MERRILL. Old and early English. Two hours a week. Professor DODGE. *Fall, winter, and spring terms, full study.*
*Required:* English, 2; French, or German, 1.

4. Eighteenth Century Prose.—Fall and winter terms. Literary Study of History. Spring term, 2 hours a week. Early English continued. Fall term. Chaucer's Canterbury Tales. Winter and spring terms, 3 hours a week. *The whole, a full study.* Professor DODGE.
*Required:* English, 3; French, or German, 1.

5. Special course for Scientific Students.—General Survey of English Literature. Fall and winter terms. Study of Scientific Prose. Spring term. Higher English Grammar. One hour a week throughout the year. *The whole, a full study.* Professor DODGE.

### GERMAN.

There are three years of instruction given in German. The first is devoted to the study of grammar. In the second a select course of reading is followed with exercises in composition and conversation. In the third the study is conducted in German; the history of literature is studied from a manual and by lectures, accompanied by critical reading of classic and latest authors.

1. For Students in College of Literature.—*Joynes-Meissner German Grammar; Joyne's German Reader; Fall, winter, and spring terms, full study.* Professor SNYDER.

2. For Students in College of Literature.—Reading, composition, and conversation. Harris's German Composition, White's German Prose, and a selection of Classics. Gœthe's Iphigenie, or Hermann and Dorothea; Schiller's Maria Stuart, Wilhelm Tell, or Jungfrau von Orleans, etc. Also selections of modern prose. Freitag's Aus dem Staate Friedrichs des Grossen; Jensen die Braune Erica; Fouqué's Undine, etc. *Fall, winter, and spring terms, full study.* Professor SNYDER.

   *Required:* German, 1.

3. For Students in College of Literature.—The study in this year is conducted in German. History of German Literature, with lectures. Assigned reading and reports thereon. Texts, Gœthe's Faust (1st part), and Torquato Tasso; Lessing's Nathan der Weise, or Minna von Barnhelm; Schiller's Wallenstein; Buchheim's Deutsche Lyrik, and selections from modern authors. *Fall, winter, and spring terms, full study.* Professor SNYDER.

   *Required:* German, 1, 2.

4. Special one year's course for students in Colleges of Agriculture, Engineering and Science. *Otis's German Grammar; Joyne's Reader; Hodges's German Science Reader. Fall, winter, and spring terms, full study.* Assistant Professor MERRILL and Mr. PIATT.

5. Special Scientific Readings.—Equivalent of German 2 in the winter and spring terms. *Gore's Science Readings; Seidensticker's Scientific Monographs; and assigned readings. Winter and Spring terms, full study.* Professor SNYDER.

## French.

Of the four courses provided in this subject the first three are intended for students of the language as such; the other for those who especially wish to make use of French in the prosecution of other studies. The former are mainly for students in literary courses and constitute three years of progressive work; the fourth course is for those whose chief attention is given to technical and scientific subjects.

1. For Students in College of Literature.—The course begins with a study of grammatical constructions, with exercises upon pronunciation, and with easy translations from French into English. As the work progresses greater attention is paid to grammatical rules and their applications and translations from English into French are required. Conversation is introduced as soon as the way opens. Careful attention is given to French pronunciation. *Super's Reader; Souvestre's Confessions d'un Ouvrier; Sandeau's M'lle de La Seiglière. Fall, winter, and spring terms, full study.* Professor Paradis.

2. For Students in College of Literature.—This is a second year's work for those who have had course 1. It consists of readings and translations of various selections from classical and modern writers, with a further study of syntax, of idioms, etc., and with exercises in composition and conversation. Essays in French are required. *Fall, winter, and spring terms, full study.* Professor Paradis.
   *Required:* French, 1.

3. For Students in College of Literature.—This is a third year's study following courses 1 and 2 and is elective by students who want to become further proficient in the language and literature. The instruction is given in French. *Fall, winter, and spring terms, full study.* Professor Paradis.
   *Required:* French, 1, 2.

4. For students in Colleges of Agriculture, Engineering, and Science.—This is similar to course 1; but less attention is given to grammar and more to translation from French into English, in order that students may learn to read at sight works in various departments of science and art. *Super's Reader; Souvestre's Confessions d'un Ouvrier; Sandeau's M'lle de La Seiglière. Fall, winter, and spring terms, full study.* Professor Paradis and Mr. Piatt.

### Italian.

1. Italian.—Selected readings, composition, and conversational exercises. *Grandgent's Italian Grammar and Reader; Readings from modern authors; DeAmici's Camilla, or Cuore. Fall, winter, and spring terms, full study.* Professor Snyder.

   *Required:* French, 1, or 4.

### Spanish.

1. Spanish.—Selected readings, composition, and conversational exercises. *Knapp's Spanish Grammar and Reader. Fall, winter, and spring terms, full study.* Professor Paradis.

   *Required:* French 1, or 4; or Latin, 1, 2, and 3.

### Rhetoric and Oratory.

The object of the prescribed courses outlined below is not so much the acquisition of knowledge regarding English as skill in the use of English and in oratorical delivery. They are designed chiefly to furnish the student with the ability to write well and to speak well,—to express his thoughts, both with the pen and with the voice, in a clear, effective manner.

1. Themes and Elocution.—Students from the Colleges of Agriculture, Engineering, and Science do their work in this department during their junior year. No text-book is used; but in order that all practice in writing may be intelligent, a fair working knowledge of the principles of composition is given in lectures. Ten themes are presented by each person, each of which, after correction by the instructor, is handed back to the student to be carefully re-written and returned to the instructor. Further on in the work of the year is included a carefully graded series of twenty lessons in elocution. *Phyfe's How I Should Pronounce. Fall, winter, and spring terms, three-fifths study.* Professor Brownlee.

2. Themes and Elocution.—Students from the College of Literature do the work of this department during the freshman and the senior years. Two hours a week throughout the freshman year are devoted to rhetoric and theme writing. Ten themes are required, and each, after correction, is re-written by the student. One hour a week throughout the senior year is devoted to oratorical delivery. Six lectures are given upon the art of oratory. *Genung's Practical Rhetoric; Webster's Orations. First year, two-fifths study; fourth year, one-fifth study.* Professor Brownlee.

3. Themes and Elocution.—To meet the wants of those desiring a more extended training in elocution and oratory than is furnished by the prescribed course, an elective course is provided. *Fall, winter, and spring terms, two-fifths study.* Professor BROWNLEE.

The following subjects, offered to students in the College of Literature, are described elsewhere as noted:

In College of Engineering—

Mathematics, 1, 3, 5, 7; Astronomy, 1; Physics, 1, 2.

In College of Science—

Chemistry, 1, 3, 4, 5, 9; Mineralogy, 1; Geology, 5 or 1; Meteorology, 1; Botany, 6, or 1 to 4; Zoölogy, 5, or 1, 2, 4; Entomology, 1; Physiology, 1; Anthropology, 1.

## CLASSIFICATION OF STUDIES AND REQUIREMENTS FOR GRADUATION.

Forty term credits (including military) constitute the requirement for a degree in literary courses. Every student must take the required subjects (11 terms), must select at least two majors of six terms each (12 terms) and three minors (3 terms) from the restricted electives, and may choose 14 or more subjects from the remaining majors and minors, or from the open electives. For degree of B.A. the two majors must be taken in Greek and Latin; for degree of B.L. the majors may be chosen in English, Latin, German, French, or Pedagogy.

In electing studies students must be careful to observe the preparation required for each, as given under separate subjects.

### REQUIRED SUBJECTS.

History—3 credits.
Mathematics—2 credits.
Chemistry—1 credit.
Physics—1 credit.
Themes and Elocution—2 credits.
Military—2 credits.

### RESTRICTED ELECTIVES.

| MAJORS. | MINORS. |
|---|---|
| English—6 or 9 credits. | Constitutional History—2 credits. |
| Greek—6 or 9 credits. | Political Economy—1 credit. |
| Latin—6 or 9 credits. | History of Civilization—1 credit. |
| German—6 or 9 credits. | History of Philosophy—1 credit. |
| French—6 or 9 credits. | Psychology—1 credit. |
| Pedagogy—6 credits. | Logic—1 credit. |

OPEN ELECTIVES.

Italian—3 credits.
Spanish—3 credits.
Oratory—$1\frac{1}{2}$ credits.
Art and Design—3 or 6 credits.
Botany—1 to 3, or 6 credits.
Zoölogy—1 to 3, or 6 credits.
Chemistry—3 or 5 credits.
Geology—1 or 3 credits.
Physiology—1 credit.
Mathematics—3 or 6 credits.
Physics—3 credits.
Entomology—2 credits.
Mineralogy—1 credit.
Anthropology and Meteorolcgy—1 credit.
Astronomy—1 credit.

## Suggested Courses of Study.

These courses are presented as an aid to election by students. The work of the freshman year should be taken as given in some one of these courses. Electives and specialties ought to be left for the junior and senior years, when the student has gained a more correct estimate of his own powers and preferences, as well as of his ultimate aim in life.

### ENGLISH COURSE.

#### FIRST YEAR.

1. English, 1; Advanced Algebra; Latin, German, or French; Themes; Military.
2. English, 1; Trigonometry; Latin, German, or French; Themes; Military.
3. English, 1; Astronomy, or Mathematics; Latin, German, or French; Themes; Military.

#### SECOND YEAR.

1. English, 2; Physiology; German or French; Military.
2. English, 2; Physics; German or French; Military.
3. English, 2; Botany; German or French; Military.

#### THIRD YEAR.

1. English, 3; History; Chemistry, 1.
2. English, 3; History; Zoölogy.
3. English, 3; History; Geology.

#### FOURTH YEAR.

1. English, 4; Psychology; History of Civilization; Elocution.
2. English, 4; Logic; Constitutional History (England); Elocution.
3. English, 4; Political Economy; History of Philosophy, or Constitutional History (U. S.); Elocution.

### MODERN LANGUAGE COURSE.

#### FIRST YEAR.

1. French, 1; English, 1, or Latin; Advanced Algebra; Themes; Military.
2. French, 1; English, 1, or Latin; Trigonometry; Themes; Military.
3. French, 1; English, 1, or Latin; Astronomy, or Mathematics; Themes; Military.

#### SECOND YEAR.

1. French, 2; German, 1; Physiology; Military.
2. French, 2; German, 1; Physics; Military.
3. French, 2; German, 1; Botany; Military.

#### THIRD YEAR.

1. German, 2; History; Chemistry, 1.
2. German, 2; History; Zoölogy.
3. German, 2; History; Geology.

#### FOURTH YEAR.

1. English 4, Italian, Spanish, or German, 3; Psychology; History of Civilization; Elocution.
2. English, 4, Italian, Spanish, or German, 3; Logic; Constitutional History; Elocution.
3. English 4, Italian, Spanish, or German, 3; Political Economy; History of Philosophy; Elocution.

### LATIN COURSE.

#### FIRST YEAR.

1. Latin; German, or French; Advanced Algebra; Theme Writing; Military.
2. Latin; German, or French; Trigonometry; Theme Writing; Military.
3. Latin; German, or French; Astronomy, or Mathematics; Theme Writing; Military.

#### SECOND YEAR.

1. Latin; German, or French; Physiology; Military.
2. Latin; German, or French; Physics; Military.
3. Latin; German, or French; Botany; Military.

#### THIRD YEAR.

1. Latin; History; Chemistry.
2. Latin; History; Zoölogy.
3. Latin; History; Geology.

FOURTH YEAR.

1. History of Civilization; Psychology; English 4, German, or French; Elocution.
2. Constitutional History; Logic; English 4, German, or French; Elocution.
3. Political Economy; Constitutional History, or History of Philosophy; English 4, German, or French; Elocution.

CLASSICAL COURSE.

(With maximum of Science.)

FIRST YEAR.

1. Greek; Latin; Advanced Algebra; Themes; Military.
2. Greek; Latin; Trigonometry; Themes; Military.
3. Greek; Latin; Astronomy, or Mathematics; Themes; Military.

SECOND YEAR.

1. Greek; Latin; Physiology; Military.
2. Greek; Latin; Physics; Military.
3. Greek; Latin; Botany; Military.

THIRD YEAR.

1. Greek; History; Chemistry.
2. Greek; History; Chemistry.
3. Greek; History; Chemistry.

FOURTH YEAR.

1. German, or French; Psychology; English, 4; Elocution.
2. German, or French; Logic; English, 4; Elocution.
3. German, or French; Political Economy; English, 4; Elocution.

CLASSICAL COURSE.

(With maximum of modern language, or Pedagogy.)

FIRST YEAR.

1. Greek; Latin; Advanced Algebra; Themes; Military.
2. Greek; Latin; Trigonometry; Themes; Military.
3. Greek; Latin; Astronomy, or Mathematics; Themes; Military.

SECOND YEAR.

1. Greek; Latin; Physiology; Military.
2. Greek; Latin; Physics; Military.
3. Greek; Latin; Botany; Military.

THIRD YEAR.

1. German, or Psychology; History; Chemistry.
2. German, or Logic; History; Zoölogy.
3. German, or Philosophy of Education; History; Geology.

FOURTH YEAR.

1. German, or French; Educational Psychology; History of Civilization; Elocution.
2. German, or French; Ethics; Constitutional History; Elocution.
3. German, or French; School Supervision, or Political Economy; History of Philosophy, or Constitutional History (U. S.); Elocution.

PHILOSOPHY AND PEDAGOGY.

The first and second years of this course may be those of any course in the College of Literature.

THIRD YEAR.

1. Psychology; Chemistry, or History; Latin, German or French.
2. Logic; Zoölogy, or History; Latin, German, or French.
3. Philosophy of Education; Geology, or History; Latin, German, or French.

FOURTH YEAR.

1. History of Education; Educational Psychology; History of Civilization; English, 4 (half course); Elocution.
2. School Hygiene; Constitutional History (England); English, 4 (half course); Elocution.
3. School Supervision; Pedagogical Seminary; Political Economy, or Constitutional History (U. S.); English, 4 (half course); Elocution.

# SCHOOL OF ART AND DESIGN.

Professor Frank Forrest Frederick.
Edith Adelaide Shattuck.

This school subserves a twofold purpose. (1) It affords to the students of the several colleges the opportunity to acquire such a knowledge of free hand drawing as their chosen courses may require. (2) It offers to such as have a talent or taste for art the best facilities for pursuing studies in industrial designing or other branches of fine art.

Special students, not otherwise connected with the University, may enter this school upon payment of very moderate fees.

In all courses the work is made of direct benefit to the students in other lines, and at the same time it aims to develop in them a love for, and an appreciation, of the beautiful.

Work must be taken at the times indicated below and all students must satisfactorily complete the requirements of each term before taking up that of the next.

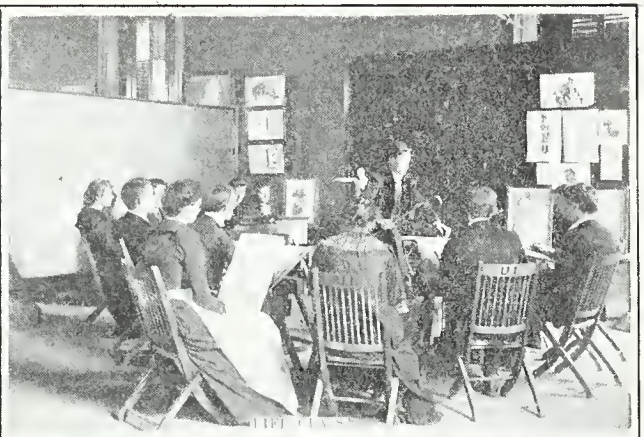
## Equipment and Facilities.

The art gallery is of much use to students of this school. A description of this is given on page 22. The school owns a large number of casts of ornament from the Alhambra and other Spanish buildings, presented by the Spanish government. Also another valuable set of casts from Germany, illustrating German Renaissance ornament. In addition the school owns all the casts and models usually found in an art school, together with a large number of objects for still life. Students have the use of the collection of American and foreign drawings and photographs, numbering several thousands, belonging to the department of architecture, and of the University library which is particularly rich in works on art. The principal English and American art magazines are found in the reading room.

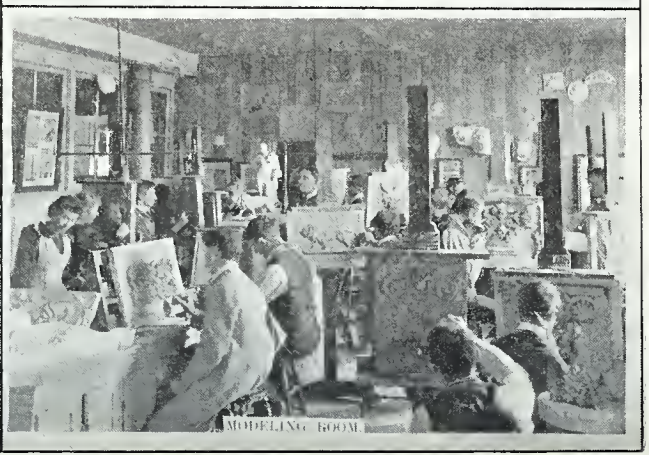
## COURSES OF STUDY.

1. For Special Students of Art and Design.—First year, first term. Principles of free hand drawing learned from drawing geometric solids (*a*) in outline, (*b*) in washes of water color, (*c*) in values of charcoal.

ELEMENTARY CLASS



ART GALLERY



MODELING ROOM

Second term. Principles applied by drawing (*a*) groups of common objects, as books, vases, chairs, tables, etc.; (*b*) casts of ornament; (*c*) interior, as the corner of the room; (*d*) plants and flowers from nature.

Third term. Study of anatomy, usings Duval's Artistic Anatomy as text book, and drawing from Rimmer's Art Anatomy and Julien's Études D'Aprés l'Antique. Also outline drawing from the antique figure, and shaded drawings in charcoal of details of the human figure and animal forms.

Lectures are given throughout the year on design and the historic styles of ornament. Students are required to prepare (*a*) a monograph of the ancient mediaeval or modern styles, (*b*) original exercises showing principles and methods, (*c*) original exercises employing color.

Lectures on perspective are given the second term and the problems then worked out are illustrated by sketches from nature made during the third term.

Second year, first term. Modeling in clay (*a*) details of human face, (*b*) copy of cast of ornament, (*c*) ornament from photograph. Casts are made of (*a*) at least one modeled piece, (*b*) arm, hand, or foot from nature, (*c*) foliage, fruit, or vegetable from nature.

Second term. Painting in oil color: (*a*) study in monochrome from still life; (*b*) group, as a study for composition and color.

Third term. Painting in water color: (*a*) group, as a study for composition and color; (*b*) flower and foliage from nature; (*c*) sketching from nature.

Design. (*a*) An original design for capital, panel, or spandrel—modeled and cast. (*b*) An original design for surface decoration in color.

Third year, flrst term. Advanced work in oil and water color painting, and sketching from nature in color.

Second term. Modeling (*a*) bas-relief from antique figure, (*b*) anatomical rendering of an antique figure, (*c*) bust from the antique, (*d*) portrait head from nature in round or relief.

Third term. (*a*) Shaded study of antique figure. (*b*) Portrait head from nature. (*c*) Sketching from nature in color.

Design. Details comprising the human, animal, plant, and insect forms for the purpose of design, and an original practical design employing part of this material. *Three years, double study.* Professor FREDERICK.

2. For Students of Design.—First term, same as work in design of course 1; also study of the relation of design to manufacture.

Second term. Study of color as a means of interior and exterior decoration. At least one color scheme to be worked out, full size, in tempera colors.

Third term. Practice in designing in the line of work of which the student wishes to make specialty. *One year, double study.* Professor FREDERICK.

*Required:* Art and Design, 1, first two years.

3. For Students of Architecture.—First year, first term, same as first term of course 1. Second term, same as course 1, except that special attention is given to the drawing of casts of ornament and interiors.

Third term, rendering perspectives in washes of water color (sepia). Sketching from nature. *Frederick's Architectural Rendering in Sepia.*

Design, same as in course 1.

Perspective, same as in course 1.

Instruction in pen etching is given throughout the year, but most of the work must be done out of hours. *Gregg's Architectural Rendering in Pen and Ink.*

Second year, first term, same as in course 1. Second term, same as in course 1; or as in second term, third year, course 1; or as in second term, third year, course 2. Third term, same as in course 1; or as in third term, third year of course 1.

Design, same as in course 1. *Two years, full study.* Professor FREDERICK.

4 For students in College of Agriculture, and School of Natural Science—First term, same as in course 1. Second term, same as in course 1, except that special attention is given to drawing plant and animal forms from nature. Third term, use of pen and ink and water color in work relating to these courses.

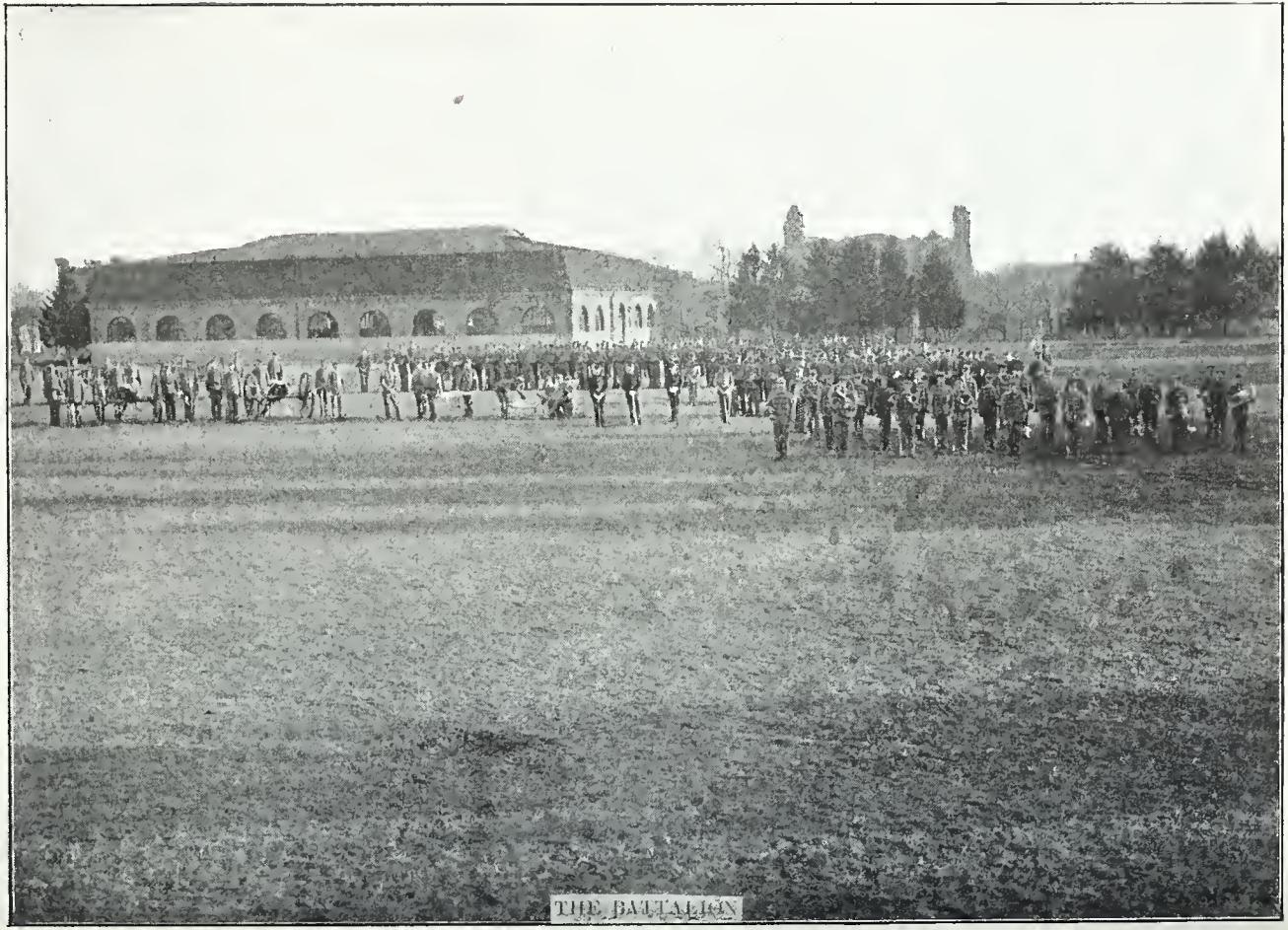
Design, same as in course 1. *One year, full study.* Professor FREDERICK.

5. For Students of Mechanical, Electrical, and Civil Engineering and of Chemistry.—First term, same as in course 1. Second term, same as in course 1, except that special attention is given to drawing details of machinery and chemical apparatus. *Fall and winter terms, full study.* Professor FREDERICK.

6. For Students in College of Literature.—The work in this course is the same as course 1, as far as time will allow, including design. Students are required to attend the lectures of course 7. *One or two years, full study.* Professor FREDERICK.

7. Course in the History of Art.—Lectures with collateral reading. Selections from Ruskin, Sir Joshua Reynolds, Viollet le Duc, Day's Work on Ornament, Penot and Chipiez' and Reber's histories of art, and other works relating to the history and methods of painting, sculpture, and architecture.

   These lectures are illustrated by several hundred lantern slides and are open to all students of the department. *Winter term, once a week.* Professor FREDERICK.



THE BATTALION

# SCHOOL OF MILITARY SCIENCE.

PROFESSOR ELBRIDGE R. HILLS,
Captain 5th Artillery, U.S.A.

The military instruction is under the charge of a graduate of the U. S. Military Academy, and an officer of the regular army of the United States. The course as a whole has special reference to the duties of officers of the line. A full supply of arms and ammunition is furnished by the War Department, including 300 cadet rifles and accoutrements, and two field pieces of artillery. Ammunition is supplied for the practice and target firing and for artillery use.

Every male student, able to perform military duty and not excused for sufficient cause, is required to drill twice each week until he has gained six creditable term records. He is also required to study the Drill Regulations for Infantry and to recite upon the same once a week until he passes two creditable term examinations. This practical instruction begins as soon as possible after he enters the University; but a preparatory student, carrying no freshman studies and not expecting to matriculate during the year, is not permitted to drill. The standings in study and drill are placed on record, with other class credits; two terms of recitations and drill count one credit, and the four remaining terms of drill another, and are requisite to graduation in every University course.

Appointments in the battalion are made on nomination by the professor in charge and confirmation by the Faculty.

Students who have passed two examinations in the drill regulations and who have gained two term credits in drill practice are eligible for corporals; those having three term credits in each are eligible for sergeants; and those having six term credits in each, for lieutenants and for officers of higher rank.

The battalion (four companies) is composed mainly of the members of the freshman and sophomore classes; the first supplying the corporals, the second, the sergeants, while the captains and lieutenants are taken from those of the junior class who have passed through the lower grades satisfactorily.

A special military scholarship, good for one year, is open to each student who attains the grade of a commissioned officer, the value of which is paid the holder at the close of the year.

An artillery detachment is organized mainly from the second year or sophomore class, which receives practical instruction twice each week during the college year.

Towards the close of the spring term, a committee appointed by the Faculty examines candidates for nomination to the governor of the state to receive commissions as brevet captains in the state militia. Candidates must be members of the senior class in full standing at the time of this examination; must have completed the course of military studies; must have served three terms as captains or lieutenants, and must be approved by the Faculty, as having good reputations as scholars, officers, and gentlemen.

Under the authority of the acts of incorporation, the Trustees have prescribed a uniform of cadet gray, with black cloth trimming, cut after the pattern prescribed by the U. S. Army Regulations; members of the band to wear the usual additional trimmings. The uniform of the commissioned officers is that of officers of the same grade in the National Guard. All members of the battalion wear the University badge on the cap. Uniforms must be procured within one month after entering upon military duty, and must be worn at all military formations.

The University Cornet Band is composed of students, and every full term of service therein is counted as one term of drill.

## COURSES IN MILITARY SCIENCE.

1. Drill Regulations.—For all male students. School of the soldier; school of the company in close and in extended order; bayonet exercise. *Fall and winter terms, one-fifth study.* Professor HILLS.

2. Drill Practice.—For all male students. *Six terms, two-fifths study.* Professor HILLS.

3. Recitation and Practice for Military Class.—(*a*) School of the battalion: close and extended order: artillery drill.

(*b*) Ceremonies, review, and inspection; military signaling; sword exercise; artillery drill.

(*c*) Guard, outpost, and picket duty; military signaling; artillery drill.

(*d*) Military administration; reports and returns; theory of fire arms; target practice.

(*e*) Organization of armies; field fortifications; art of war. *Seven terms, recitations, 1 to 2 hours a week; drill, 2 hours a week.* Professor HILLS.

# MUSIC.

GUISEPPE NAPOLEONE CAROZZI.

Music constitutes no part of any University course of studies, and is, therefore, not provided by the Trustees. But, as many students desire instruction in music, competent teachers are selected by the Trustees, and rooms are set apart for the purpose. Instruction in vocal music and voice culture is given to individuals and to classes.

TUITION.

| | |
|---|---|
| Piano instruction ten weeks—2 lessons a week | $15 00 |
| Ten weeks—1 lesson a week | 8 00 |
| Use of piano, one hour daily, per term | 2 00 |
| Vocal instruction ten weeks—2 lessons a week | 20 00 |
| Ten weeks—1 lesson a week | 12 00 |

No deduction on account of absence in either course, except in case of protracted illness.

Special students in music will also be charged the regular term fee charged other students of the University.

# PRIZES AND SCHOLARSHIPS.

## THE CONKLIN ORATORICAL PRIZES.

Mr. R. R. Conklin, an alumnus of the University, has offered two prizes, of $60 and $40, respectively, for original orations from juniors, to be pronounced at such time as the Faculty may appoint during the week of commencement. Competition is open to such as are full members of the junior class. From the orations submitted on or before the 17th day of April, a number, not to exceed ten, to be selected by the Faculty, will be presented on the platform, and to the first and second best, as may be determined by judges, the prizes will be awarded.

## THE HAZLETON PRIZE MEDAL.

Capt. W. C. Hazleton provided a medal, of beautiful and artistic design, which is to be awarded at a competive drill to be held near the close of the year, to the best drilled student. Each competitor must have been in attendance at the University for at least sixteen weeks of the current college year; must not have had more than four unexcused absences from drill; and must present himself for competition in full uniform.

The award will be made on the following points:

1. Erectness of carriage, military appearance, and neatness.
2. Execution of the school of the soldier, without arms.
3. Manual of arms, with and without numbers.

The successful competitor will receive a certificate setting forth the facts, and may wear the medal until the 15th day of May following, when it will be returned for the next competition.

## HONORARY SCHOLARSHIPS.

Provision has been made for one honorary scholarship for each county in the state. The holder of the scholarship may attend the University for four years, under proper regulations, free of charge for tuition or incidental expenses. The total value of this scholarship is $90.

Several of these scholarships are already occupied. The vacancies in other counties will be filled as follows:

Examinations are to be held in the several counties, under the supervision of the county superintendents thereof, on the second Friday and Saturday of June, at such places as the superintendents may select. Candidates for the examination must be approved in the common English branches by the superintendents. Questions will be furnished from the University, and the answers, in writing, will be sent to the University for judgment. The scholarship will be awarded to the candidate who passes the best examination, provided he has a standing in each subject of not less than 75, and an average standing on all the subjects of not less than 80, per cent.

Each pupil who enters the examination may choose whether he will be examined to enter upon a course in the Colleges of Agriculture, Engineering, or Science, or one of the courses in the College of Literature.

In the first case, the subjects of his examination will be algebra, geometry, physiology, botany, natural philosophy, and English rhetoric.

In the second case, the subjects will be algebra, geometry, botany, or natural philosophy, three books of Cæsar, five orations of Cicero, and six books of the Aeneid.

The two classes of examinations are intended to be as nearly equivalent as possible, and to conform to the requirements stated under the head, *Examinations for Admission*, p. 149. It is essential that the examinations in the counties be held at the time named above, publicly, and with reasonable notice; requests for special or private examinations can not be considered.

## ACCREDITED SCHOOL SCHOLARSHIPS.

Scholarships in the University are offered to high schools on its accredited list, one a year to each school, upon the same terms and subject to the same conditions as the HONORARY SCHOLARSHIPS heretofore established, *except as noted below:*

1. Examinations for the *accredited school scholarships* will be held at the several accredited schools, by the principals thereof, on the third Thursday and Friday in May.

2. There need be no advertisement of the examination, further than by principals to all pupils eligible to pass the same.

3. The term of each scholarship will be for the two school years next after the examination upon which it was awarded, and vacancies will not be filled, except that if any person to whom a scholarship has been awarded shall be unable to accept the same, then the next highest in the competition may be awarded the scholarship.

4. Scholarships will be awarded on these examinations to such persons only as shall be full graduates of their several accredited schools, either of the current or some preceding year.

## CHICAGO CLUB LOAN FUND.

The CHICAGO CLUB OF THE UNIVERSITY OF ILLINOIS offers two loans of $250.00 each, payable to the beneficiary, $100.00 the first year, $75.00 the second year, $50.00 the third year, and $25.00 the fourth year. The loans are offered to residents of Cook County, Illinois, only, and are to be awarded upon competitive examination to those obtaining the highest average grades. The loans are due six years after matriculation. They bear no interest while the student is in school, but six per cent. after graduation. The examination questions are prepared at the University and cover the same subjects as those for the honorary scholarships.

A SPECIMEN ROOM.

## MILITARY SCHOLARSHIPS.

Students who have gained six term credits in class room military instruction and six such credits in drill practice are eligible for appointment as commissioned officers of the battalion. Those attaining this rank may have awarded them special scholarships, good for one year and equal in value to the University term fees for the same length of time.

## FELLOWSHIPS.

Four fellowships, each of $400 a year, are offered to members of the Graduate School, in connection with which further particulars in regard to them are given.

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# SOCIETIES.

The Literary Societies have from the opening of the University enjoyed its fostering care.

The ADELPHIC and PHILOMATHEAN societies, for men, and the ALETHENAI, for women, occupy spacious halls, which the members have furnished and decorated with taste and elegance. Meetings are held Friday evenings throughout the term time, are well attended, and are maintained with unflagging interest. They furnish excellent drill in writing, speaking, and parliamentary methods.

Both the YOUNG MEN'S and YOUNG WOMEN'S CHRISTIAN ASSOCIATIONS are active and useful organizations and have a large membership.

Special organizations unite the students of NATURAL HISTORY, of CIVIL ENGINEERING, of MECHANICAL ENGINEERING, of ARCHITECTURE, of AGRICULTURE, and of CHEMISTRY, and in ATHLETICS.

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# GRADUATE SCHOOL.

Instruction and the facilities of advanced study and research are now offered to the graduates of this and of other colleges and universities without fees or payment of any kind, except for actual laboratory expenses. The diploma of any college or university in good standing is accepted for admission, instead of entrance examinations. No formal courses of study are prescribed, but special arrangements are made to

meet as nearly as practicable the wishes of each applicant. Such students do not attend regular recitations or lectures unless they also take some undergraduate work, in which case they conform to the usages of the class attended, and pay the regular fees. They may be requested to give one or more class lectures in the line of their special studies. A second degree is awarded upon the completion of the required studies and the presentation of an accepted thesis. The general requirements for degrees may be found elsewhere under the proper heading.

## FELLOWSHIPS.

The University offers four fellowships, open to graduates of this or other similar institutions, conditioned upon required qualifications and a designated amount of service to the University. Each fellowship is good for one year and has a money value of $400.00, payable in ten monthly installments. Appointments to these fellowships are made upon the grounds of good character, high attainments, promise of distinguished success in the line of studies chosen, and of usefulness to the University. The holders of the fellowships are required to give instruction in assigned subjects 5 to 10 hours a week during the year. The time remaining is to be devoted to graduate study; and, upon the completion of a prescribed course and the presentation of a proper thesis, a second degree is awarded.

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# UNIVERSITY EXTENSION.

The University offers a series of lecture courses by members of the Faculty upon a considerable number of the subjects taught by them. It is an extension of University instruction to people at their homes who cannot attend the institution itself as students, but yet desire the information that such students gain. In the endeavor to make the University doubly useful to the people of the state, the professors hold themselves in readiness to lecture upon invitation in any accessible locality, if consistent with regular duties. The subjects and lectures are the same as at the University, so that there is a real extension of its teaching. The course upon a single subject usually consists of six lectures, one given each week and commonly upon Friday or Saturday evening. For each lecture there is distributed a printed syllabus or outline giving also

directions to the best literature upon the subject, and other information. The lectures are preceded or followed by reviews, quizzes, and discussions; and at the end of the course an examination may be held. To those satisfactorily passing such examinations a special certificate is issued in the name of the University, and the proper records are made upon its books.

A special series of lectures has been arranged for teachers' summer institutes. These are not intended to take the place of the ordinary instruction given in such institutes, but to present University subjects, by University methods, as far as possible, with all the aids of illustrative and demonstrative equipments.

A special circular giving the subjects and lectures for each academic year is issued during the early autumn and is sent on application. The announcements for the year 1892-93 were as follows:

Botany, Professor Burrill; History of Civilization, Professor Crawford; Mediæval History, Professor Crawford; Agriculture, Professor Morrow; Oratory, Professor Brownlee; Composition, Professor Brownlee; Physiology, Professor Rolfe; Geology, Professor Rolfe; Chemistry, Professor Palmer; Water Supply, Professor Palmer; History of Art, Professor Frederick; Chemistry of the Household, Professor Parr; Applications of Chemical Investigations to Practical Agriculture, Mr. Farrington; The Early History of Illinois, the Local and State Government, Professor Barton; Greek Literature, Professor Moss; English Life and Literature in the Nineteenth Century, Professor Dodge; History of the English Language, Professor Dodge; English Literature, Some Prose Writers of the Nineteenth Century, Professor Merrill; Electricity, Professor Shea; Experimental and Physiological Psychology, Professor Krohn; Astronomy, Professor Myers.

# REGULATIONS AND ADMINISTRATION.

## ADMISSION.

Examinations of candidates for admission to the University, or to any of its departments, are held at the University itself, on the two days previous to the opening of each term, and at other times and places specially announced.

Applicants must be at least fifteen years of age, and it is considered desirable that they be three to five years older than this. They must pass the required examinations, and must pay the prescribed fees. No distinction is made in regard to sex, nativity, color, or place of residence. Entrance may be made at any time, provided the candidate is competent to take up the work of the classes then in progress; but it is very much better to begin upon the first collegiate day in September, when a large number of the classes are organized, several of them to continue during the year. Satisfactory entrance may usually be made at the beginning of the winter term.

The engineer and architect should be adepts in the various departments of drawing, and some previous study of this branch will be of great advantage. Faunce's Mechanical Drawing is recommended as a text book, and the drawings should be made on smooth paper, eight by ten inches, then inked properly.

### ENTRANCE EXAMINATIONS.

The subjects upon which entrance examinations are held are numbered and described in the list given below. Those required for the several colleges and courses are designated by the groups of numbers corresponding to the subjects in the list. The physics, physiology and botany described are each required as preparatory to these subjects as taught in this University. The text-books are named only to aid in showing the requirements. Equivalents are accepted.

1. For the Preparatory Classes.—Subjects, 1, 2, 3, 4.

2. For the Colleges of Agriculture, Engineering, and Science.—Subjects, 1, 2, 3, 4, 5, 6, 7, and any three from 12, 13, 14, 15, 16, 17, 18.

Instead of the literature part of 5, 10 or 11 will be accepted; but candidates presenting one of these will be required to take one year's advanced language work in his undergraduate course.

3. For the College of Literature.—Subjects, 1, 2, 3, 4, 5, 6, 7, 8, and any three from 12, 13, 14, 15, 16, 17, 18. For those who desire to take courses including Greek, 9 is required and may be presented instead of the three sciences which would otherwise be selected from 12 to 18.

4. For entrance to the University without designation of a particular department.—Subjects 1, 2, 3, 4, 5, 6, 7, and any three from 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18. In this case special attention must be paid to the requirements for entrance to particular classes as given above and in connection with the description of the subjects under the several colleges; also to the requirements for a degree, if this is desired.

5 Persons over twenty-one years of age, not candidates for a degree, may be admitted to classes, after satisfying the Regent and professor in charge of the department in which such classes are taught, that they possess the requisite information and ability to pursue profitably, as special students, the chosen subjects. Such students are not matriculated; they pay the fees required of students in the preparatory classes.

SUBJECTS FOR ENTRANCE EXAMINATIONS.

1. ARITHMETIC.—Simple and denominate numbers, metric system of weights and measures, common and decimal fractions, practical measurements, percentage, ratio and proportion. Grammar or high school work.

2. GEOGRAPHY.—Mathematical, physical, and political divisions and natural features of the earth's surface; movements of the air and water, climates, natural and commercial productions, animals and man. Grammar school study.

3. HISTORY.—The most important facts in the history of the United States from the settlement of the country to the present time, but especially the main features of the constitution and the development under it of the republic and of the states. Grammar or high school study.

4. ENGLISH GRAMMAR.—The essentials of orthography, etymology, and syntax; including the derivation and composition of words, their

classification as parts of speech, declension and conjugation; sentential analysis, with definition and classification of parts, whether principal or subordinate, whether words, phrases, or clauses. Illustrative words, sentences, etc., may be required as well as the correction of ungrammatical examples.

5. English Composition and Literature.—Correct spelling, capitalization, punctuation, paragraphing; definition and proper use of rhetorical figures; a knowledge of the qualities of style, the kinds of discourse, and the elements of versification; an acquaintance with the masterpieces of English literature. Besides answering questions on the above, the candidates will be required to write an essay of something like 500 words to illustrate his power of using the English language, and his knowledge of the literature. For 1893 these essays will be upon subjects drawn from one or two of the following works: Shakspere's Julius Cæsar; Scott's Marmion, Webster's First Bunker Hill Oration, Goldsmith's Deserted Village, Irving's Sketch Book. For 1894 the works required will be: Shakspere's Merchant of Venice, Scott's Lady of the Lake, Emerson's American Scholar, Longfellow's Evangeline, Macaulay's Second Essay on the Earl of Chatham.

Real equivalents for any of these works will be accepted.

6. Algebra.—Fundamental operations, factoring, fractions, simple equations, involution and evolution, radicals, quadratic equations and equations reducible to the quadratic form. The subject as given in Wells's University Algebra through quadratic equations, or the same in Wentworth's Algebra.

7. Geometry.—Plane, solid and spherical geometry as given in Wells's Plane and Solid Geometry.

8. Latin.—Three books of Cæsar's Commentaries, five orations of Cicero, six books of Virgil's Aeneid, with scansion of hexameter verse and the translation of English sentences into Latin prose, based on the portions of Cæsar and Cicero above named. This will necessitate a thorough knowledge of the etymology and syntax of Latin grammar.

Harkness's or Allen and Greenough's Grammar and Collar's Latin Prose Composition are recommended.

Real equivalents for any of the above mentioned works will be accepted.

The Roman method of pronunciation is used.

9. GREEK.—Greek Grammar (Goodwin's or Hadley's), Greek Prose Composition (Jones's), and four books of Xenophon's Anabasis, or two books of the Anabasis and Herodotus, Mathew's Selections. Writing Greek with the accents will be required.

   The so-called Continental sounds of the vowels and diphthongs and pronunciation according to accent are recommended.

10. FRENCH.—Elements of grammar, tested by the correct translation of simple English sentences into French and by questions; reading easy French prose at sight. At least one year's work.

11. GERMAN.—Elements of grammar, tested by the correct translation of simple English sentences into German and by questions; reading easy German prose at sight. At least one year's work.

12. PHYSICS.—The elements of physics as given in Gage's Introduction to Physical Science, taught with the use of apparatus for illustration and experiment.

13. PHYSICAL GEOGRAPHY.—The subject as presented in Hinman's Eclectic Physical Geography. High school study after the elements of other sciences necessary to the elucidation of the subject have been mastered.

14. ASTRONOMY.—The subject as given in Newcomb and Holden's Astronomy for High Schools and Colleges.

15. CHEMISTRY.—The non-metalic elements as presented in Remsen's Chemistry, Briefer Course. Laboratory practice is essential for the proper preparation in this subject.

16. PHYSIOLOGY.—The anatomy, histology, and physiology of the human body and the essentials of hygiene, taught with the aid of charts and models and demonstrations upon inferior animals, to the extent given in Martin's Human Body, Briefer Course.

17. Botany.—The parts and organs of plants in the descriptive language of the science; the relations of plants to the atmosphere, to temperature, light, soil, etc., to the inferior animals, and to man; characteristics of prominent orders and the determination of species by use of an artifical key. Gray's Lessons and Manual.

18. Zoölogy.—The subject as taught in the best high schools with laboratory facilities. Mere text-book work will not be accepted.

*County Superintendents' Certificates.*—To prevent loss to those who are not prepared to enter the University, but might come, hoping to pass the examinations for admission, the following arrangement has been made:

County Superintendents of schools will be furnished with questions and instructions for the examination of candidates in the four common branches, arithmetic, geography, English grammar, and history of the United States; applicants who pass creditably will, when they present the superintendent's certificate to that effect, be admitted to the classes of the preliminary year.

Persons who hold teacher's certificates from county superintendents will be admitted to the preliminary class without further examination.

## ACCREDITED HIGH SCHOOLS.

The Faculty, after personal examination, appoints accredited high schools, whose graduates may be admitted to the University without further examination within twenty-eight months after the date of their graduation. These must be schools of first-rate character, whose course of instruction includes all the studies required for admission to some one of the colleges of the University. A member of the Faculty will examine a school making application as to its facilities for teaching, its course and methods of instruction, and the general proficiency shown. If the report is favorable, the name of the school is entered in the published list of high schools accredited by the University. The graduates of these schools are admitted to any college to which their high school studies as certified by the principal have prepared them to enter. Annual reports are asked from these schools. A re-examination will be made whenever it may be deemed necessary.

The accredited schools whose graduates are admitted to any of the colleges of the University are the public high schools in

SCHOOLS AND PRINCIPALS.

Auburn Park (Calumet High School) A. S. Hall.
Austin, Helen S. Wyllis.
Belvidere, J. C. Zinser.
Bloomington, Edward Manly.
Cairo, T. C. Clendenen.
Champaign, R. L. Barton.
Chicago, North, O. S. Westcott.
Chicago, South, Jeremiah Slocum.
Chicago, West, Geo. M. Clayberg.
Danville, Joseph Carter.
Decatur, Louis B. Lee.
Dixon, W. H. Williamson.
Aurora, East, E. G. Cooley.
Aurora, West, Kittie Reynolds.
Beardstown, M. Moore.
Bement, J. M. Martin.
Blue Island, C. H. Morrill.
Canton, C. M. Bardwell.
Charleston, Louise Baumberger.
Chicago, Northwest, Franklin P. Fisk.
Clinton, Ia., Julia J. Sweet.
Davenport, Ia., H. H. Roberts.
Delaven, Geo. A. Franklin.
Dundee, S. M. Abbott.

Elgin, H. F. Derr.
Evanston, H. L. Boltwood.
Freeport, R. W. Burton.
Hyde Park, Chas. W. French.
Jersevyille, J. Pike.
Kankakee, C. L. Clippinger.
Kewanee, Horace Phillips.
Lake, E. F. Stearns.
Lincoln, Jane Kidd.
Maywood, C. W. Minard.
Moline, B. C. Caldwell.
Ottawa, J. O. Leslie.
Peoria, A. W. Beasley.
Quincy, W. B. Corbyn.
Rock Island, J. A. Bishop.
Springfield, Wm. W. Helmle.
Taylorville, A. C. Butler.
Urbana, J. W. Hayes.
Englewood, James E. Armstrong.
Farmer City, E. E. Bean.
Galena, Kate McHugh.
Jacksonville, Virginia Graves.
Joliet, F. M. Townsend.
Keokuk, Ia., George F. Marshall.
LaGrange, H. W. Thurston.
Lake View, James H. Norton.
Mattoon, E. Kate Carman.
Mendota, West, Wm. R. Foster.
Oak Park, W. E. Goddard.
Paris, A. Harvey.
Princeton, Richard A. Metcalf.
Rockford, Walter A. Edwards.
South Chicago, C. I. Parker.
Streator, R. Williams.
Tuscola, Chas. S. Earle.
Wilmington, J. J. Eckman.

Also the high school of the Normal University, at Normal, O. L. Manchester, principal.

The accredited schools whose graduates are admitted to the Colleges of Engineering, of Agriculture, or of Science, are the public high schools in

SCHOOLS AND PRINCIPALS.

Aledo, J. P. Kuntz.
Barry, H. C. McCarrel.
Cambridge, Laura J. Haggart.
Centralia, Inez Brunton.
Collinsville, D. B. Fager.
DuQuoin, C. W. Harris.
Effingham, I. A. Smothers.
Greenville, D. W. Lindsey.
Hillsboro, Margaret Hubbard.
LaSalle, Geo. W. Andrew.
Lexington, Frank L. Horn.
Marengo, C. W. Hart.
Mound City, M. N. McCartney.
Olney, O. J. Bainum.
Pekin, F. W. Reubelt.
Pittsfield, I. F. Mathers.
Augusta, Annie McKee.
Belleville, H. W. Brua.
Camp Point, J. W. Creekmur.
Chicago English High and Manual Training School, D. R. Anderson.
East St. Louis, C. L. Manners.
Gibson City, J. D. Shoup.
Harvard, C. W. Groves.
Keithsburg, K. M. Whitham.
Lena, S. A. Harker.
Lyons, Ia., H. E. Robbins.
Monticello, J. H. Martin.
Newman, J. L. Hughes.
Onarga, J. R. Freebern.
Peru, Carrie V. Smith.
Polo, I. M. Bridgman.

Ridge Farm, E. Hollingsworth.
Rochelle, C. F. Philbrook.
Shelbyville, F. D Jordan.
Sparta, John M. Nickles.
Sterling, (Wallace High School) S. B. Hursh.
Tolono, J. A. Holady.
Warsaw, Kate Johnston.
Watseka, V. L. Huey.
Wenona, Ira M. Ong.
Robinson, W. C. Neilson.
Rossville, H. W. Flanegin.
Sheldon, M. L. Weems.
Sterling, A. Bayliss.
Sullivan, B. F. McClelland.
Sycamore, A. J. Blanchard.
Warren, I. C. Baker.
Washington, F. L. Calkins.
Waverly, J. M. Humer.
Yorkville, W. J. Sutherland.

Also the Chicago Manual Training School, H. H. Belfield, Principal.

## REGISTRATION.

At the beginning of each term each student must present himself for registration during the two days preceding the formation of classes; and he must be present and be registered at the first exercise of each class he is to attend.

## CHOICE OF STUDIES.

Great freedom in the choice of studies is permitted. It is, however, necessarily required that the student shall be thoroughly prepared to enter, and keep pace with, the classes in the chosen studies; that he shall take these in the terms and at the time of day elsewhere designated, and that, when expecting to take a degree, he pursue the studies leading to that degree. In the College of Engineering the courses are practically prescribed. Following the description of each course of instruction given under the several colleges will be found the necessary requirements, if any, for admission to that particular course. Careful attention must be given to these requirements and to the sequence of studies thus indicated. For instance, under Descriptive Astronomy, for students of the College of Engineering, page 58, there are required "mathematics, 4;" "physics, 1;" "theoretical and applied mechanics, 1." Turning now to the general list of subjects, page 26, it is found that mathematics 4, page 31, is trigonometry; physics 1, page 32, is the major course of one year, and theoretical and applied mechanics 1, page 33, is analytical mechanics. All these subjects must have been satisfactorily passed before admission to the class in astronomy can be gained.

The work in military instruction and drill practice is required as described, of all male students during the freshman and sophomore years. Women are excused.

The described courses in rhetoric and oratory must be taken by all students at the times and to the extent given in the suggested and prescribed courses of study.

Each student must have three distinct studies, affording three daily class exercises, unless specially permitted by the Faculty to take less or more.

## TERM EXAMINATIONS.

Examinations are held at the close of each term or oftener, or whenever any study has been completed. Any student failing to answer correctly 60 per cent of the questions proposed, loses all credit for that study, and is precluded from proceeding with any other studies without special permission. If he answers from 60 to 74 per cent of the questions he is *conditioned* and may have another examination on application to, and arrangement with, the instructor. 75 per cent is required to pass.

A record is kept of each student's term work and standing, and from this his final certificate of graduation is made up.

A statement of the scholarship of each student will be sent to his parent or guardian as soon as may be after the end of each term.

## DEGREES.

The usual bachelors' and masters' degrees are conferred upon those who satisfactorily complete the courses of study described under the different colleges. A candidate for a bachelor's degree must pass in the subjects marked *required* in his chosen course, and must conform to the directions given in connection with that course in regard to electives. In the College of Engineering he must complete the course of study as laid down. In the Colleges of Agriculture and Literature and in the school of natural science 40 term credits, and in the College of Engineering and in the school of chemistry 41 term credits are required for graduation. This includes two credits for military science which are not required of women, who may therefore graduate with two credits less than the number stated. Men, excused for cause from the military requirements, may elect in lieu thereof two extra terms' work in any subjects taught in the University.

Credits from other colleges or universities may be accepted by the Faculty for advanced standing; but at least one year's residence at the University and the completion of one year's work are necessary to secure a bachelor's degree.

In all cases an accepted thesis is required for graduation. The subject must be announced not later than the first Monday of the winter term, and the completed thesis must be handed to the dean of the proper College by April 30th. The work should be done under the direction of the professor in whose department the subject naturally belongs, and should be in the line of the course of study for which a degree is expected. The thesis should be based upon original research, and must contain at least 2,000 words, or an equivalent in tables, drawings, and illustrations. It must be presented upon regulation paper and will be deposited in the library of the University.

1. The degree of Bachelor of Arts will be given to those who complete a classical course in the College of Literature.

2. The degree of Bachelor of Letters will be given to those who complete one of the other courses in the College of Literature. The name of the course will be inserted after the degree.

3. The degree of Bachelor of Science will be given to those who complete a course of study in the College of Engineering, of Agriculture, or of Science. The name of the course will be inserted after the degree.

4. The master's degrees, M.A., M.L., and M.S., and the equivalent degrees of Civil Engineer and Mechanical Engineer, etc., will be given, after 1894, to graduates of this or other similar institutions who have pursued at this University a year of prescribed graduate studies and have passed examinations thereon, or who have pursued as non-residents three years of such study and have passed the required examinations. Studies for a master's degree must be in the general line of the bachelor's degree already received, and of the degree sought.

In all cases an accepted thesis is required and this should be presented at least one month before the close of the collegiate year. It must be based upon original research and must show scholarly acquirements of high order.

Graduates of this University who took a first degree before 1892 may obtain a second degree as heretofore, until after 1894.

## BOARD.

The University does not furnish board, but there is an abundance of suitable private places in Urbana and Champaign within walking distance of the University; and easily accessible by electric railway, where students can obtain table board and rooms. Boarding clubs are formed, at which the cost of meals is about two and a half dollars per week. Some students prepare their own meals, thus considerably reducing expenses.

The Business Agent and the Young Men's and Young Women's Christian Associations of the University will aid new students in procuring rooms and boarding places.

## EXPENSES.

THE TUITION IS FREE in all the University classes.

THE MATRICULATION FEE entitles the student to membership in the University until he completes his studies ..... $10 00

THE DIPLOMA FEE, payable before graduation ..... 5 00

THE TERM FEE for incidental expenses is for each student..... 7 50

Each student working in laboratories, or in the draughting or engineering classes, is required to make a deposit varying from 50 cents to $10, to pay for chemicals and apparatus used, and for any breakages or damages.

ALL BILLS due the University *must be paid within ten days after the student enters classes.*

### ESTIMATES OF EXPENSES.

The following are estimated maximum and minimum annual expenses exclusive of books and clothing, railroad fare, and small miscellaneous needs.

| | | |
|---|---|---|
| Term fees | $22 50 | $22 50 |
| Room rent for each student | 18 00 | 50 00 |
| Table board in boarding houses and clubs | 90 00 | 126 00 |
| Fuel and light | 10 00 | 15 00 |
| Washing at 60 cents per cents per dozen | 9 00 | 18 00 |
| Total | $149 50 | $231 50 |
| Board and room in private houses, per week | 4 00 | 6 00 |

### FEES IN THE PRELIMINARY YEAR, OR THE JUNIOR COURSE IN AGRICULTURE.

| | |
|---|---|
| Tuition, per term | $ 5 00 |
| Incidental fee, per term | 7 50 |

### CAUTION TO PARENTS—STUDENTS' FUNDS.

The Business Agent will receive on deposit any funds parents may intrust to him to meet the expenses of their sons and daughters. *No greater error can be committed than to send young people from home with large amounts of spending money*, without the authoritative care of some

prudent friend. Half the dissipation in colleges springs from excessive allowances of money. Students have little real need for money beyond that required for fees, board bills, and books. The attention of parents and guardians is earnestly requested to this matter, and especially in the case of those students who are under age.

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# PREPARATORY CLASSES.

To meet an urgent demand, the Trustees have temporarily provided for teaching the preparatory studies lying between the work of the elementary schools and the University. Candidates for these classes must not be less than fifteen years old. They must pass a satisfactory examination in arithmetic, geography, English grammar, and history of the United States.

Students in the preparatory studies are not matriculated as members of the University. They pay no entrance fee, but are charged a tuition fee of five dollars a term, and an incidental fee of seven and a half dollars a term. They have all the privileges of the library, and of public lectures.

The studies taught in the preliminary year are as follows:

FOR COLLEGES OF AGRICULTURE, ENGINEERING, AND SCIENCE.

*First term.*—Algebra—(Wells's). Fundamental rules, factoring, common divisors and multiples, powers and roots, calculus of radicals, simple equations, proportion and progression. Physiology—(Cutter's). Natural Philosophy—(Gage's).

*Second Term.*—Algebra—Quadratic equations, etc. Geometry—(Wells's) Plane geometry, lines, circumferences, angles, polygons, as far as equality. English—Elements of composition. (Clark's). Orthoepy and word analysis. (Introduction of Webster's Academic Dictionary.)

*Third Term.*—Geometry completed, including solid and spherical geometry. English, as in the second term, with addition of Goldsmith's Deserted Village, Shakspere's Merchant of Venice, Scott's Lady of the Lake, Emerson's The American Scholar, Longfellow's Evangeline, Macaulay's Second Essay on the Earl of Chatham, Scott's Marmion, Webster's first Bunker Hill oration, and Irving's Sketch Book, read with care. Botany—Gray's Lessons and Manual.

FOR COURSES IN THE COLLEGE OF LITERATURE, EXCEPT THE CLASSICAL COURSE.

*First Term.*—Algebra as above. Physiology. Natural Philosophy. Latin—Cicero's Orations. Prose composition.

*Second Term.*—Algebra and Geometry, as above. Latin—Aeneid. Prose composition.

*Third Term.*—Geometry, as above. Botany. Latin—Aeneid. Prose composition.

FOR CLASSICAL COURSE.

*First Term.*—Algebra, as above. Latin—Cicero's Orations. Prose composition. Greek—Grammar (Goodwin) and Reader (Moss). Prose composition.

*Second Term.*—Algebra and Geometry, as above given. Latin—Aeneid. Prose composition. Greek—Continuation of first term. Prose composition.

*Third Term.*—Geometry completed. Latin—Aeneid. Prose composition. Greek—Anabasis (Kelsey). Prose composition. (Woodruff).

# LIST OF STUDENTS.

## GRADUATE SCHOOL.

| | | |
|---|---|---|
| Piatt, Herman S, B.A., (Fellowship) | *Champaign*, | Classical. |
| Woodworth, Howard Oakley, B.S., | *Champaign*, | Natural Science. |
| Barber, Alice May, B.S. (Fellowship) | *La Fox*, | Natural Science. |
| Parr, Mrs. Lucie Hall, | *Champaign*, | Music. |

## RESIDENT GRADUATES.

| | | |
|---|---|---|
| Hart, Ralph Warner, B.S., | *Harvey*, | Architecture. |
| McHugh, George B, B.S., | *Urbana*, | Chemistry. |
| Myers, George William, M.L., | *Urbana*, | Mechanical Engineering. |
| Pence, William David, | *Champaign*, | Civil Engineering. |
| Seibert, Emma Effie, B.S., | *Champaign*, | Natural Science. |

## SENIOR CLASS.

| | | |
|---|---|---|
| Andrews, Hubert Franklin, | *Piasa*, | Natural Science. |
| Arbeiter, George John, | *Plainfield*, | Eng. and Mod. Lang. |
| Bacon, Harlow, | *Huntsville*, | Civil Engineering. |
| Barrett, Edward Ernest, | *Port Byron*, | Civil Engineering. |
| Bartlett, Henry Emmett, | *Mt. Sterling*, | Civil Engineering. |
| Behrensmeyer, George Philip, | *Quincy*, | Architecture. |
| Blakesley, George Webster, | *Rock Island*, | Electrical Engineering. |
| Brown, Frank Manear, | *Champaign*, | Architecture. |
| Carpenter, Harvey Irving, | *Urbana*, | English and Mod. Lang. |
| Carr, Robert Franklin, | *Argenta*, | Chemistry. |
| Carter, Charles Willard, | *Aledo*, | English and Mod. Lang. |
| Chambers, William Rock, | *Sadorus*, | English and Mod. Lang. |
| Chester, Oscar Paul, | *Champaign*, | Natural Science. |
| Coffeen, Fred Goldsmith, | *Champaign*, | Chemistry. |
| Cook, James W, | *Rock Island*, | Mech. Engineering. |
| Cornell, William Henry, | *Grant Park*, | Mech. Engineering. |
| Craig, Edward Chilton, | *Mattoon*, | Latin. |
| Danley, Willis Wilson, | *Hennepin*, | Civil Engineering. |
| Earl, Mark Alden, | *Centralia*, | Civil Engineering. |

| | | |
|---|---|---|
| Fraser, Wilber John, | *Plainfield*, | Agriculture. |
| Gibbs, William David, | *Winchester*, | Agriculture. |
| Graham, Louis Thomas, | *Pittsfield*, | English and Mod. Lang. |
| Graham, William Johnson, | *Aledo*, | English and Mod Lang. |
| Gulick, Frank M, | *Champaign*, | Eng. and Mod. Lang. |
| Higgins, Albert Grant, | *Elmwood*, | Architecture. |
| Hucke, Philip Matthias, | *Mascoutah*, | Natural Science. |
| Hunt, Edward Everett, | *Urbana*, | Chemistry. |
| Kinkead, James Albert, | *Earlville*, | Chemistry. |
| Klingel, Louis, | *Mascoutah*, | Eng. and Mod. Lang. |
| Levy, Alexander, | *Brookfield, Mo.*, | Architecture. |
| Loomis, Arthur Bates, | *Fulton*, | Civil Engineering. |
| McCartney, William Priestly, | *Metropolis*, | Chemistry. |
| McCloy, Robert Emmett, | *Welton*, | English and Mod. Lang. |
| McClure, Clyde Benjamin, | *Gibson City*, | Civil Engineering. |
| McGee, Walter Scott, | *Deers*, | Natural Science. |
| McMains, Louis, | *Crawfordsville, Ind.*, | Nat. Science. |
| Metcalf, James David, | *Girard*, | Chemistry. |
| Millar, Clendon VanMeter, | *Mattoon*, | Chemistry. |
| Mosier, Jeremiah George, | *Urbana*, | Natural Science. |
| Peterson, Adolph Bertinus, | *Chicago*, | Architecture. |
| Phillips, James David, | *Englewood*, | Architecture. |
| Powers, Will Ambrose, | *Belvidere*, | Chemistry. |
| Rea, Alfred Willemin, | *Urbana*, | Architecture. |
| Rowe, William Briggs, | *Champaign*, | Classical. |
| Russell, Charles Wesley, | *Virginia*, | Classical. |
| Scott, Donald Gamaliel, | *Champaign*, | Architecture. |
| Seaman, George Washington, | *Urbana*, | Mechanical Engineering. |
| Sharpe, Richard W., | *Tiskilwa*, | Natural Science. |
| Shiga, Shigetsura, | *Tokio, Japan*, | Architecture. |
| Skielvig, Severin Canute, | *Chicago*, | Architecture. |
| Spalding, Fred Milton, | *Gibson City*, | Civil Engineering. |
| Steinwedell, William Ernest, | *Quincy*, | Electrical Engineering. |
| Stewart, John Truesdale, | *Paxton*, | Civil Engineering. |
| Swenson, Bernard Victor, | *Chicago*, | Elect. and Mech. Eng'ring. |
| Sy, Albert Philip, | *Altamont*, | Chemistry. |
| Thompson, Almon Daniel, | *Gilman*, | Civil Engineering. |
| Townsend, William, | *Champaign*, | Civil Engineering. |
| Vial, Robert Clarke, | *Western Springs*, | Civil Engineering. |
| Woodruff, Thomas Tyson, | *Quincy*, | Electrical Engineering. |
| Young, Orres Ephraim, | *Stonington*, | Eng. and Mod. Lang. |

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|---|---|---|
| Arnold, Mary Edna, | *Souders*, | Classical. |
| Ayers, Grace, | *Urbana*, | Eng. and Mod. Lang. |
| Johnson, Harriette Augusta, | *Rock Island*, | Eng. and Mod. Lang. |
| Lamkin, Nina Belle, | *Champaign*, | Eng. and Mod. Lang. |
| Mann, Mary Estelle, | *Geneva*, | Eng. and Mod. Lang. |
| Mathews, Loueva May, | *Urbana*, | Eng. and Mod. Lang. |
| Peterson, Sophia Mary, | *Champaign*, | Eng. and Mod. Lang. |

## JUNIOR CLASS.

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|---|---|---|
| Aranda, Ezequiel, | *Allende, Mex.*, | Mech Engineering. |
| *Arms, Franklin David, | *Chicago*, | Architecture. |
| Armstrong, James William, | *Toulon*, | Electrical Engineering. |
| Atwood, Levi Patton, | *Rockford*, | Civil Engineering. |
| Babcock, Clyde Leslie, | *Harvard, Neb.*, | Civil Engineering. |
| Barker, Louis William, | *Sparta*, | Electrical Engineering. |
| *Baughman, Charles Otis, | *Camp Point*, | Civil Engineering. |
| Bauman, Otto, | *Quincy*, | Electrical Engineering. |
| Beasley, Harrison Easton, | *Peoria*, | Civil Engineering. |
| Bissell, Frank, | *Farmer City*, | Latin. |
| Braucher, Herbert Hill, | *Lincoln*, | Agriculture. |
| Brownell, Charles Dean, | *Champaign*, | Chemistry. |
| Browning, Howard Allen, | *Elgin*, | Architecture. |
| Bush, Arthur Willis, | *Joliet*, | Architecture. |
| Butterfield, Clarence James, | *Chicago*, | Architecture. |
| Chipman, Paul, | *Mt. Carmel*, | Civil Engineering. |
| Coffman, Birch David, | *Champaign*, | Natural Science. |
| Cornell, Frank Howe, | *Yorkville*, | Natural Science. |
| Crawford, Thomas, | *Sterling*, | Electrical Engineering. |
| Dickinson, Richard Joy, | *Eureka*, | Civil Engineering. |
| Eakle, Silas Jackson, | *Forreston*, | Natural Science. |
| Earl, Edward Curtis, | *Centralia*, | Architecture. |
| Engberg, Martin Jonas, | *Chicago*, | Chemistry. |
| Foote, Ferdinand John, | *Champaign*, | Electrical Engineering. |
| Foster, Alfred Bradford, | *Urbana*, | Civil Engineering. |
| Frederickson, George, | *Champaign*, | Natural Science. |
| Gaffin, William Ward, | *Leaf River*, | Civil Engineering. |
| Gaut, Robert Eugene, | *Mt. Sterling*, | Civil Engineering. |
| Goldschmidt, Otto Emil, | *Davenport, Ia.*, | Elec. Engineering. |
| Gumbiner, Charles, | *Peoria*, | Civil Engineering. |
| Heideman, George Herman, | *Elmhurst*, | Electrical Engineering. |

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|---|---|---|
| Holbrook, Fred Samuel, | *Englewood*, | Chemistry. |
| Holston, Benjamin Baldwin, | *Nashville*, | Natural Science. |
| Hottes, Charles Frederick, | *Mascoutah*, | Natural Science. |
| Jansen, Dietrich Herman, | *Pekin*, | Civil Engineering. |
| Johannsen, Albert, | *State Center, Ia.*, | Architecture. |
| Johannsen, Oskar August, | *State Center, Ia.*, | Architecture. |
| Jasper, Thomas, | *Quincy*, | Electrical Engineering. |
| Kennedy, John William, | *Collinsville*, | Architecture. |
| Kerns, Shirley Kendrick, | *Champaign*, | Chemistry. |
| *Kimball, Conrad Bryant, | *Champaign*, | Architecture. |
| Kimball, William Haven, | *Chicago*, | Mechanical Engineering. |
| Lake, Edward John, | *Viroqua, Wis.*, | Architecture. |
| Lockwood, Frank Miner, | *Champaign*, | Architecture. |
| Lowry, James Percival, | *Gibson City*, | Architecture. |
| Lowry, John Albert, | *Gibson City*, | Civil Engineering. |
| McConnell, Ernst, | *Table Rock, Col.*, | Architecture. |
| McNutt, John, Jr., | *Humbolt*, | Latin. |
| Miller, Grant Clark, | *Rockford*, | Architecture. |
| Mogenson, Peter, | *Copenhagen, Denmark*, | Civ. Eng. |
| Morris, Edgar William, | *Onarga*, | English and Mod. Lang. |
| Morrissey, Daniel C, | *Champaign*, | Eng. and Mod. Lang. |
| Needham, James, | *Collinsville*, | Mining Engineering. |
| Parry, Joseph Lawrence, | *Tolono*, | English and Mod. Lang. |
| *Phelps, Albert Charles, | *Lockport*, | Architecture. |
| Reed, James Horatio, | *Evanston*, | Electrical Engineering. |
| *Riley, Walter Busey, | *Champaign*, | Eng. and Mod. Lang. |
| Rutledge, John Joseph, | *Alton*, | Mining Engineering. |
| Slater, William Frederick, | *Urbana*, | Electrical Engineering. |
| Stocker, Edwin Warren, | *Rock Island*, | Architecture. |
| Strauss, William, | *Pittsfield*, | Chemistry. |
| Strehlow, Oscar Emil, | *Champaign*, | Civil Engineering. |
| *Strout, Frank Asbury, | *Elwood*, | Mechanical Engineering. |
| Tackett, William C, | *Champaign*, | Eng. and Mod. Lang. |
| Templeton, Benjamin Franklin, | *Palestine*, | Classical. |
| Tower, Willis Eugene, | *Chana*, | Chemistry. |
| Trego, Charles Henry, | *Hoopeston*, | Electrical Engineering. |
| Walton, Thomas Percival, | *Paxton*, | Civil Engineering. |
| Weaver, Leslie Alvord, | *Danville*, | Latin. |
| Weedman, Fred John, | *Farmer City*, | Eng. and Mod. Lang. |
| Wilder, Charles Thornton, | *Champaign*, | Natural Science. |
| Yeakel, William Kriebel, | *Polo*, | Natural Science. |

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|---|---|---|
| Boggs, Pearl, | *Urbana*, | Classical. |
| McCaskrin, Louise Elizabeth, | *Rantoul*, | Natural Science. |
| Naughton, Katheryn Louise, | *Champaign*, | Eng. and Mod. Lang. |
| Nichols, Maude E, | *Urbana*, | Natural Science. |
| *Scott, Daisy Coffin, | *Champaign*, | Latin. |
| Shawhan, Gertrude, | *Urbana*, | English and Mod. Lang. |
| Wingard, Anna Laura, | *Champaign*, | Eng. and Mod. Lang. |
| Woolsey, Ola C, | *Polo*, | Lat. and Eng. and Mod. Lang. |

## SOPHOMORE CLASS.

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|---|---|---|
| Arms, Herbert Clarke, | *Chicago*, | Architecture. |
| Armstrong, John Adams, | *Kewanee*, | Mechanical Engineering. |
| Ashley, Richard Jason, | *Tonica*, | Mechanical Engineering. |
| Atkinson, John Thomas, | *Wilmington*, | Mech. Engineering. |
| Ayers, Clarence Otto, | *Nashville*, | Natural Science. |
| Barr, Richard James, | *Wilton Center*, | Eng. and Mod. Lang. |
| Barry, Charles, | *Henry*, | Mechanical Engineering. |
| Baum, Harry William, | *Indianola*, | Civil Engineering. |
| Beebe, Fred Albert, | *Wisner, Neb.*, | Mech. Engineering. |
| Boon, William Guthrie, | *Armstrong*, | Civil Engineering. |
| Bower, Lorin Alphonso, | *Oreana*, | Civil Engineering. |
| *Bower, Robert Allan, | *Tolono*, | Eng. and Mod. Lang. |
| Burdick, Charles Baker, | *Sterling*, | Civil Engineering. |
| Burrill, William Thomas, | *Shelby, Neb.*, | Architecture. |
| Busey, Frank Lyman, | *Urbana*, | Mechanical Engineering. |
| Capps, Earl Vanhise, | *Mt. Pulaski*, | Electrical Engineering. |
| Carberry, Ray Shepard, | *Mansfield*, | Civil Engineering. |
| Carmack, Clyde Roberts, | *Camargo*, | Mechanical Engineering. |
| Carnahan, David Hobart, | *Champaign*, | Latin. |
| Carpenter, Frank Albert, | *Rockford*, | Architecture. |
| Chester, Wilfred Dudley, | *Champaign*, | Mining Engineering. |
| Clark, Amos Cable, | *Urbana*, | Architecture. |
| *Clement, Clarence Adelbert, | *Tiskilwa*, | Civil Engineering. |
| *Clinton, John Dewitt, | *Polo*, | Chemistry. |
| Decius, Lyle, | *Toledo*, | Eng. and Mod. Lang. |
| *Doxey, Samuel, | *Ogden City, Utah*, | Architecture. |
| Drake, Louis Sanford, | *Chicago*, | Eng. and Mod. Languages. |
| Duffy, Sherman, | *Ottawa*, | Latin. |

*Behind one study.

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|---|---|
| Elder, Charles Abbott, | *Topeka, Kan.*, Architecture. |
| Emmons, Henry Jeffers, | *Atkinson*, Civil Engineering. |
| *Fay, Frank Earle, | *Marengo*, Civil Engineering. |
| Fellheimer, Alfred, | *Chicago*, Architectural Engineering. |
| Fletcher, Marcus Samuel, | *Ridge Farm*, Natural Science. |
| Fulton, George Thomas, | *Waterman*, Civil Engineering. |
| Funston, Jesse Grant, | *Champaign*, Mechanical Engineering |
| Frye, Theodore Christian, | *Congerville*, Natural Science. |
| Green, James Albert, | *Ivesdale*, Mechanical Engineering. |
| Hall, Emery Stanford, | *Urbana*, Architecture. |
| Harms, Armin, | *Rock Island*, Chemistry. |
| Harvey, Guy Charles, | *Tolono*, Chemistry. |
| Herdman, Herbert Orville, | *Taylorville*, Natural Science. |
| Hiles, Elmer Kirkpatrick, | *Chicago*, Mechanical Engineering. |
| *Hobbs, Reuben Merrill, | *Yorkville*, Chemistry. |
| Holtzman, Stephen Ford, | *Pontiac*, Architectural Engineering. |
| Huff, George A, Jr., | *Englewood*, Chemistry. |
| Hunt, Ernest Alexander, | *Urbana*, Electrical Engineering. |
| Johnson, Herbert Lewis, | *Elgin*, Architecture. |
| Johnson, Lewis Williams, | *Champaign*, Chemistry. |
| Johnston, Elmer Alward, | *Champaign*, Mechanical Engineering. |
| Junkersfeld, Peter, | *Sadorus*, Electrical Engineering. |
| *Keeler, Frederick Blair, | *Earlville*, Architecture. |
| Kerchner, Fred William, | *Belleville*, Chemistry. |
| Ketchum, Milo Smith, | *Elmwood*, Civil Engineering. |
| Lemen, William Clarence, | *Morganfield, Ky.*, Civil Engineering. |
| Lewellyn, David Rossiter, | *Sterling*, Mechanical Engineering. |
| Long, Albert Milton, | *Virden*, Architecture. |
| Lyons, Timothy John, | *Sadorus*, Electrical Engineering. |
| McCaskrin, George Washington, | *Rantoul*, Chemistry. |
| McCaskrin, Harry Madison, | *Rantoul*, Natural Science. |
| *McLane, John Wallace, | *Allerton, Ia.*, Chemistry. |
| McRae, John Alexander, | *Kewanee*, Mechanical Engineering. |
| Manu, Edward Loring, | *Gilman*, Eng. and Mod. Lang. |
| Marsh, Horatio Richmond, | *Joliet*, Natural Science. |
| Mather, Fred Elbert, | *Naperville*, Arch. Engineering. |
| Maxon, Robbins Yale, | *Danville*, Civil Engineering. |
| Maxwell, Charles Jacob, | *Champaign*, Chemistry. |
| Morrison, William Robert, | *Joliet*, Architecture. |
| Munn, Alexander Majors, | *Swift, Neb.*, Civil Engineering. |

*Behind one study.

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|---|---|---|
| Neal, John Dodge, | *Rantoul*, | Chemistry. |
| Orr, Edward Ellsworth, | *Quincy*, | Architecture. |
| Parker, Hervey Edwin, | *Champaign*, | Architecture. |
| *Perkins, Allie Christian, | *Tolono*, | Electrical Engineering. |
| Quade, John Conrad, | *Moline*, | Civil Engineering. |
| Reely, Thomas, | *Spring Green, Wis.*, | Architecture. |
| Reeves, Harley Edson, | *Champaign*, | Civil Engineering. |
| Roberts, Francis Eugene, | *Chicago*, | Architectural Engineering. |
| Roby, Luther Edward, | *Decatur*, | Mechanical Engineering. |
| Root, George Hinchliff, | *Chicago*, | Architectural Engineering. |
| Royer, Joseph William, | *Urbana*, | Architecture. |
| Roysdon, William Ira, | *Champaign*, | Eng. and Mod. Lang. |
| Sayers, Albert Jefferson, | *Champaign*, | Mech. Engineering. |
| Scott, William John, | *Champaign*, | Civil Engineering. |
| Scurlock, Henry Harrison, | *Jackson, Ohio*, | Natural Science. |
| Seastone, Charles Victor, | *New Boston*, | Civil Engineering. |
| Shepardson, John Eaton, | *Aurora*, | Civil Engineering. |
| Smith, Louie Henrie, | *Crystal Lake*, | Chemistry. |
| Snider, Harry Holderman, | *Rantoul*, | Mechanical Engineering. |
| Sperling, Godfrey, | *Dewey*, | Civil Engineering. |
| Spurgin, William Grant, | *Urbana*, | Classical. |
| Stark, Robert Watt, | *Augusta*, | Chemistry. |
| Stoltey, Benjamin Franklin, | *Champaign*, | Architecture. |
| Stowell, Hanson Abbott, | *Anona, Fla.*, | Eng. and Mod. Lang. |
| Tarble, Myron Joy, | *Aurora*, | Civil Engineering. |
| Teeple, Wallace Douglas, | *Marengo*, | Architecture. |
| Thomas, Homer, | *Kickapoo*, | Arch. Engineering. |
| Vance, Walter Noble, | *Bement*, | Electrical Engineering. |
| Webster, Charles Carlton, | *Polo*, | Mechanical Engineering. |
| White, Solon Marks, | *Sandwich*, | Natural Science. |
| Williams, Parker Merrill, | *Moline*, | Electrical Engineering. |
| *Williams, Scott, | *Bloomington*, | Mech. Engineering. |
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| Beidler, Gertrude Lou, | *Champaign*, | Eng. and. Mod. Lang. |
| *Brown, Katherine, | *Oreana*, | Natural Science. |
| Call, Hortense, | *Urbana*, | Natural Science. |
| Foote, Dora Francelia Burton, | *Champaign*, | Natural Science. |
| Forbes, Bertha, | *Urbana*, | Natural Science. |
| Green, Marianna, | *Champaign*, | Eng. and Mod. Lang. |
| Ludden, Eva Louise, | *East Lynn*, | Eng. and Mod. Lang. |

*Behind one study.

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| McCullough, Jessie Olive, | *Urbana*, | Eng. and Mod. Lang. |
| McFadden, Alice Alberta, | *Champaign*, | Natural Science. |
| Moore, Grace Lillian, | *Tolono*, | Natural Science. |
| *Pillsbury, Bertha Marion, | *Urbana*, | Classical. |
| Stewart, Mabel, | *Champaign*, | Natural Science. |
| Thompson, Marion, | *Bement*, | Latin. |

## FRESHMAN CLASS.

| | | |
|---|---|---|
| Adams, Edward Langford, | *Austin*, | Mechanical Engineering. |
| Arnold, John William, | *Lockport*, | Civil Engineering. |
| Atherton, George Henry, | *Streator*, | Mining Engineering. |
| Bailey, Leonard Lionel, | *Chicago*, | Architectural Engineering. |
| Baird, Walter Hayes, | *Normal*, | Electrical Engineering. |
| Banschbach, Edward Aaron, | *Princeton*, | Electrical Engineering. |
| Bassett, John Benjamin, | *Kewanee*, | Architecture. |
| Beasley, Abel Harwood, | *Champaign*, | Chemistry. |
| Begole, Joshua Franklin, | *O'Fallon*, | Mechanical Engineering. |
| Bell, James Arthur, | *Channahon*, | Electrical Engineering. |
| †Bennett, Charles Gerrish, | *Mattoon*, | Classical. |
| Benson, Oliver Newkirk, | *Champaign*, | Architecture. |
| Bigham, John Ross, | *Chatsworth*, | Mechanical Engineering. |
| Boggs, Fortune Stanley, | *Urbana*, | Mechanical Engineering. |
| Bower, Samuel Meharry, | *Tolono*, | Natural Science. |
| Boyd, George, | *Roseville*, | Civil Engineering. |
| Brenke, William Charles, | *Chicago*, | Chemistry. |
| Brode, Arthur Willis, | *Buda*, | Mechanical Engineering. |
| Brower, Ralph Plumb, | *Ottawa*, | Civil Engineering. |
| Brown, Fred Gage, | *Urbana*, | Architecture. |
| Bryant, Lester Peck, | *Princeton*, | Civil Engineering. |
| Buford, Clarke Howe, | *Rock Island*, | Architecture. |
| Burdsal, Charles Southerd, | *Evanston*, | Mining Engineering. |
| Burke, William Harry, | *Urbana*, | Electrical Engineering. |
| Burtt, Wilson Bryant, | *Hinsdale*, | Civil Engineering. |
| Bussey, Clyde George, | *Lanark*, | Mechanical Engineering. |
| Campbell, Walter Gilbert, | *Urbana*, | Electrical Engineering. |
| Carr, Walter Scott, | *Argenta*, | Natural Science. |
| Carswell, Arthur Scott, | *New City*, | Electrical Engineering. |
| Chapman, Frank, | *Galesburg*, | Electrical Engineering. |
| Chapman, Paul Reed, | *Chicago*, | Electrical Engineering. |

*Behind one study.
† Deceased.

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| Chatten, Melville Clark, | *Quincy*, | Architecture. |
| Chester, Henry Ezra, | *Champaign*, | Chemistry. |
| Cook, Harry Vance, | *Rock Island*, | Electrical Engineering. |
| Cook, Walter Scott Downing, | *St. Louis, Mo.*, | Architecture. |
| Cooper, Paul Henry, | *Mendota*, | Electrical Engineering. |
| Colver, Horace Nathaniel, | *Marengo*, | Electrical Engineering. |
| Cowles, Roy Merrick, | *Englewood*, | Mechanical Engineering. |
| Cutter, Scott Clay, | *Oswego*, | Chemistry. |
| Crum, Herbert Andrews, | *Farmer City*, | Eng. and Mod. Lang. |
| Donnan, Alexander, | *Independence, Ia.*, | Architecture. |
| Downing, Ernest Albert, | *Belvidere*, | Electrical Engineering. |
| Durstine, Warren Edward, | *Rock Falls*, | Electrical Engineering. |
| Drury, George Edward, | *Wilmette*, | Architecture. |
| Ellis, William Sterling, | *Chicago*, | Architecture. |
| Elwood, Roy Spencer, | *Nashville*, | Electrical Engineering. |
| Estee, Henry Clarence, | *Gibson City*, | Civil Engineering. |
| Evans, Robert Herman, | *Bloomington*, | Architecture. |
| Everett, Frank Milton, | *Quincy*, | Electrical Engineering. |
| Ferguson, Eugene Ray, | *Morris*, | Mechanical Engineering. |
| Fitzwilliam, Frank Joel, | *Bloomington*, | Architecture. |
| Flynn, Thomas Francis, | *Tolono*, | Electrical Engineering. |
| Fouts, Lewis Hayden, | *Bradford*, | Eng. and Mod. Lang. |
| Gableman, Julius, | *Okawville*, | Civil Engineering. |
| Gamble, Samuel Welsey, | *Chicago*, | Architecture. |
| Gearhart, Orval Lee, | *Farmer City*, | Architecture. |
| Gray, Frederick, | *Bloomington*, | Electrical Engineering. |
| Green, Herbert John, | *Kewanee*, | Architecture. |
| Gulick, Seeley, | *Champaign*, | Natural Science. |
| Hamilton, Frank Henry, | *Springfield*, | Civil Engineering. |
| Hamilton, Vernor Edward, | *Gardner*, | Architecture. |
| Hanker, William Julius, | *Toledo*, | Architecture. |
| Haskell, Howard Hall, | *Mendota*, | Electrical Engineering. |
| Havard, Oliver David, | *Homer*, | Electrical Engineering. |
| Hawker, Frank Allen, | *Urbana*, | Electrical Engineering. |
| Heaton, Thomas Reid, | *Delavan*, | Civil Engineering. |
| Heisel, Henry Marshall, | *Chicago*, | Mechanical Engineering. |
| Higgins, Charles Campbell, | *Aurora*, | Mechanical Engineering. |
| Hindman, John, | *Urbana*, | Eng. and Mod. Lang. |
| Hoag, Parker Hale, | *Champaign*, | Classical. |
| Honens, Fred William, | *Milan*, | Civil Engineering. |
| Hottes, Henry Gustav, | *Mascoutah*, | Architecture. |

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|---|---|---|
| Hubbard, George David, | *Urbana*, | Agriculture. |
| Hughes, Frank Alexis, | *Okawville*, | Civil Engineering. |
| Jackson, Z Edward, | *Atchison, Kan.*, | Electrical Eng. |
| Jobst, George J, | *Peoria*, | Civil Engineering. |
| Jones, Fred R, | *Neponset*, | Mechanical Engineering. |
| Karpen, Julius, | *Chicago*, | Latin. |
| Keck, Hiram Isaac, | *Montgomery*, | Electrical Engineering. |
| Keeler, Harry, | *Chicago*, | Natural Science. |
| Kent, Louis Maxwell, | *Danville*, | Natural Science. |
| Ketchum, Richard Bird, | *La Prairie*, | Civil Engineering. |
| Killam, Francis Grimes, | *Comer*, | Mechanical Engineering. |
| Klossowski, Theodore Julius, | *Dixon*, | Civil Engineering. |
| Kuhn, Anthony Edward, | *Tiskilwa*, | Natural Science. |
| Larimore, Charles Wesley, | *Jacksonville*, | Electrical Engineering. |
| Leigh, Charles Wilber, | *La Prarie Center*, | Electrical Eng. |
| Lenning, Ernest Hjalmar, | *Chicago*, | Mechanical Engineering. |
| Lewis, Charles Milton, | *Blue Mound*, | Architecture. |
| Lienisch, Walter Herman, | *O'Fallon*, | Mechanical Engineering. |
| Liese, George Charles, | *Nashville*, | Architecture. |
| Linn, Homer Roberts, | *Byron*, | Mechanical Engineering. |
| Ludwick, George, | *St. Joseph*, | Civil Engineering. |
| McBride, Willis Brammer, | *Taylorville*, | Civil Engineering. |
| McElfresh, Fred Morgan, | *Jacksonville*, | Natural Science. |
| MacGregor, Leonard Allen, | *Earlville*, | Architecture. |
| McKee, Eli Earl, | *Rising*, | Architectural Engineering. |
| McNichols, Ira Arthur, | *Tolono*, | Chemistry. |
| Manard, Robert Payton, | *Rockford*, | Architecture. |
| Marble, Harry Curtis, | *Champaign*, | Electrical Engineering. |
| Mead, Ellis Herman, | *Belvidere*, | Electrical Engineering. |
| Mell, Joseph Lenard, | *San Jose*, | Civil Engineering. |
| Millar, Harry Knowles, | *Mattoon*, | Civil Engineering. |
| Milne, Edward Lawrence, | *Lockport*, | Civil Engineering. |
| Morse, Jedidiah D, | *Champaign*, | Chemistry. |
| Mueller, Oscar, | *Decatur*, | Mechanical Engineering. |
| Myers, James William, | *Chrisman*, | Eng. and Mod. Lang. |
| Naughton, Charles Colby, | *Champaign*, | Mech. Engineering. |
| Nelson, Francis Lovell, | *Paris*, | Eng. and Mod. Lang. |
| Noble, Charles William, | *Chicago*, | Architectural Engineering. |
| Noble, William, | *Champaign*, | Classical. |
| Ogiwara, Chijokichi, | *Tokio, Japan*, | Mech. Engineering. |
| Patterson, William Madison, | *Farmer City*, | Eng. and Mod. Lang. |

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| Peterson, Martin, | *Englewood*, | Architecture. |
| Pfeffer, John Edward, | *Bondville*, | Mechanical Engineering. |
| Phelps, George Budd, | *Carlinville*, | Architecture. |
| Pierce, William Thomas, | *Mt. Carroll*, | Civil Engineering. |
| Porter, Robert Knight, | *Champaign*, | Classical. |
| Randall, Parke Benjamin, | *Aurora*, | Civil Engineering. |
| Ray, George Joseph, | *El Paso*, | Civil Engineering. |
| Reardon, Edward Emmett, | *Boynton*, | Eng. and Mod. Lang. |
| Reasoner, Mathew Aaron, | *Philo*, | Natural Science. |
| Rice, Henry Burgett, | *Lewistown*, | Agriculture. |
| Rickard, Earnest Thomas, | *Springfield*, | Electrical Engineering. |
| Risor, Cady Alvern, | *Eureka*, | Electrical Engineering. |
| Rogers, John Francis, | *Chicago*, | Chemistry. |
| Roberts, John Jacobs, | *Sadorus*, | Electrical Engineering. |
| Row, George Edward, | *Centralia*, | Mechanical Engineering. |
| Rowe, Herbert Brunskill, | *Redmon*, | Chemistry. |
| Sachse, Edward George, | *Morris*, | Electrical Engineering. |
| Salamson, Max, | *Chicago*, | Mechanical Engineering. |
| Saunders, Harry J, | *Chicago*, | Natural Science. |
| Seeber, Peter, | *Tomlinson*, | Natural Science. |
| Sexton, Leon Jay, | *Viola*, | Natural Science. |
| Sherman, Cecil Harvey, | *Elgin*, | Architectural Engineering. |
| Shea, John Clark, | *Danville*, | Mechanical Engineering. |
| Shippee, Henry Claud, | *Steward*, | Chemistry. |
| Simons, Alexander Martin, | *Quincy*, | Electrical Engineering. |
| Southward, Harry Austin, | *New Boston*, | Electrical Engineering. |
| Staley, William Theron, | *Urbana*, | Eng. and Mod. Lang. |
| States, William Daniel, | *Elwood*, | Mechanical Engineering. |
| Steele, William LaBarthe, | *Springfield*, | Architecture. |
| Stone, Percy Allyn, | *Bradfordton*, | Electrical Engineering. |
| Stroker, George Dick, | *Palatine*, | Civil Engineering. |
| Swannell, Dan Gardner, | *Champaign*, | Chemistry. |
| Sweney, Don, | *Mason City*, | Mechanical Engineering. |
| Sylvester, Edmund Lewis, | *Aurora*, | Civil Engineering. |
| Tait, Daniel Webster, | *Macon*, | Agriculture. |
| Taylor, Wilson, | *Urbana*, | Eng. and Mod. Lang. |
| Thompson, Fred Lawrence, | *Isabel*, | Civil Engineering. |
| Tilton, Harry William, | *Mt. Carmel*, | Electrical Engineering. |
| Ulrich, William Gus, | *Chicago*, | Civil Engineering. |
| Vail, Walter Cheney, | *Kewanee*, | Architecture. |
| VanOrstrand, Charles Edwin, | *Pekin*, | Civil Engineering. |

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| VanMeter, Seymour, | *Cantrall*, | Architecture. |
| Vickery, Charles Roy, | *Dwight*, | Natural Science. |
| Wakefield, George Mighell, | *Waterman*, | Mining Engineering. |
| Walker, George Washington, | *Walker*, | Agriculture. |
| Warnecke, Carl Marie, | *Denver, Colo.*, | Architecture. |
| Weinshenk, Theodore, | *Champaign*, | Mechanical Engineering. |
| West, George Amasa, | *Leaf River*, | Mechanical Engineering. |
| Whitham, Myron Elwise, | *Warren*, | Mechanical Engineering. |
| Whittemore, Floyd, | *Sycamore*, | Mechanical Engineering. |
| Wills, George Arthur, | *Chicago*, | Electrical Engineering. |
| Woody, Frederick Way, | *Champaign*, | Municipal Engineering. |
| Young, Clyde Cyrus, | *Stonington*, | Natural Science. |
| | | |
| Barnes, Jessie, | *Champaign*, | Natural Science. |
| Bennett, Georgia E, | *Milford Centre, O.*, | Natural Science. |
| Besore, Nellie, | *Urbana*, | Eng. and Mod. Lang. |
| Burt, Myra Ernestine, | *Urbana*, | Architecture. |
| Cairns, Cora Mae, | *Polo*, | Eng. and Mod. Lang. |
| Clarke, Florence, | *Quincy*, | Natural Science. |
| Crum, Ellen Petefish, | *Farmer City*, | Classical. |
| Fleming, Edith Anna Belle, | *Champaign*, | Eng. and Mod. Lang. |
| Gibbs, Carrie, | *Mattoon*, | Eng. and Mod. Lang. |
| Halliday, Charlotte Josephine, | *Cairo*, | Eng. and Mod. Lang. |
| Harris, Effie Estelle, | *Champaign*, | Eng. and Mod. Lang. |
| Hopper, Georgia Etherton, | *Lockport*, | Eng. and Mod. Lang. |
| Kiler, Aureka Belle, | *Urbana*, | Eng. and Mod. Lang. |
| Leal, Sophie Nott, | *Urbana*, | Eng. and Mod. Lang. |
| Mather, Althea Susan, | *Joliet*, | Eng. and Mod. Lang. |
| Munhall, Grace May, | *Champaign*, | Eng. and Mod. Lang. |
| Noble, Isabelle, | *Urbana*, | Eng. and Mod. Lang. |
| Noble, Mary Elizabeth, | *Urbana*, | Eng. and Mod. Lang. |
| O'Brien, Marguerite Helen, | *Champaign*, | Chemistry. |
| Parker, Nettie Florence, | *Champaign*, | Natural Science. |
| Read, Kate, | *Grand Ridge*, | Eng. and Mod. Lang. |
| Shlaudeman, Maud, | *Decatur*, | Eng. and Mod. Lang. |
| Smith, Mayme Lucy, | *Tuscola*, | Eng. and Mod. Lang. |
| Sparks, Marion Emeline, | *Marseilles*, | Classical. |
| Stewart, Grace Adele, | *Champaign*, | Eng. and Mod. Lang. |
| Wilcox, Mae, | *Champaign*, | Natural Science. |
| Wilder, Elizabeth Cutler, | *Champaign*, | Eng. and Mod. Lang. |
| Wilkinson, Luella Jane, | *Argenta*, | Natural Science. |

## PREPARATORY CLASS.

| | | |
|---|---|---|
| Allen, John L., | *Roodhouse*, | Natural Science. |
| Armstrong, John Walter, | *Champaign*, | Natural Science. |
| Ball, Elmer Newton, | *Mitchellville, Ia.*, | Architecture. |
| Barker, Robert Collyer, | *Peoria*, | Electrical Engineering. |
| Barker, William Prentice, Jr., | *Batavia*, | Civil Engineering. |
| Barr, George Andrew, | *Wilton Center*, | Eng. and Mod. Lang. |
| Bartlett, Warren, | *Mt. Sterling*, | Elec. Engineering. |
| Beasley, Robert Lee, | *Champaign*, | Civil Engineering. |
| Berry, Charles Jenkins, | *Guthrie Center, Ia.*, | Architecture. |
| Blake, Burton Aaron, | *Tiskilwa*, | Architecture. |
| Blakslee, James Woodberry, | *Kinmundy*, | Eng. and Mod. Lang. |
| Block, Richard Arthur, | *Sidney*, | Architecture. |
| Boal, Edward Tracy, | *Buda*, | Eng. and Mod. Lang. |
| Bohn, Paul, | *Chicago*, | Architectural Engineering. |
| Boone, Allen, | *Chrisman*, | Mechanical Engineering. |
| Bosworth, Carroll Arthur, | *Chicago*, | Civil Engineering. |
| Branch, James, | *Seymour*, | Eng. and Mod. Lang. |
| Braucher, Ralph Waldo, | *Lincoln*, | Agriculture. |
| Brockman, John, | *Davenport, Ia.*, | Elec. Engineering. |
| Brode, Luther David, | *Buda*, | Electrical Engineering. |
| Burroughs, Edward, | *El Paso*, | Civil Engineering. |
| Butz, Wallace Buell, | *Potomac*, | Chemistry. |
| Butz, Warren Robert, | *Potomac*, | Mechanical Engineering. |
| Campbell, George Henry, | *Edgewood*, | Eng. and Mod. Lang. |
| Carpenter, Millard Fillmore, | *Chicago*, | Civil Engineering. |
| Carpenter, Oliver Elijah, | *Chicago*, | Mechanical Engineering. |
| Carper, John Irving, | *Buda*, | Classical. |
| Chester, Earle, | *Champaign*, | Electrical Engineering. |
| Chester, Guy Jacob, | *Champaign*, | Natural Science. |
| Church, George Leonard, | *Atlanta*, | Eng. and Mod. Lang. |
| Clifford, John James, | *Farmer City*, | Electrical Engineering. |
| Coleman, Don Valentine, | *Sandwich*, | Agriculture. |
| Coleman, William Munson, | *Bradford*, | Architecture. |
| Davis, George Francis, | *Roseville*, | Agriculture. |
| deVries, Steven George, | *Pekin*, | Electrical Engineering. |
| deAnguera, Homer, | *Chicago*, | Civil Engineering. |
| Dighton, William, | *Monticello*, | Natural Science. |
| Dill, Arthur Williams, | *Richmond, Ind.*, | Mech. Engineering. |
| Dubsky, John Joseph, Jr., | *Chicago*, | Civil Engineering. |
| Dunkin, Will Van, | *Blue Grass*, | Classical. |

| | | |
|---|---|---|
| Eaton, Henry Cassius, | *Fulton*, | Architecture. |
| Edmiston, Frank Everett, | *Olney*, | |
| Edwards, Arthur Robinson, | *Smithshire*, | Mech. Engineering. |
| Eichinger, Will, | *Decatur*, | Mechanical Engineering. |
| Fitzgerald, John Richard, | *Bethany*, | Eng. and Mod. Lang. |
| Flanigan, Edwin Clark, | *Champaign*, | Eng. and Mod. Lang. |
| Forbes, Ernest Browning, | *Urbana*, | Natural Science. |
| Frees, Herman, | *Chicago*, | Chemistry. |
| Graham, Arthur, | *Alexis*, | Mechanical Engineering. |
| Graham, Hugh, | *Illiopolis*, | Civil Engineering. |
| Green, Frank Hopkius, | *Ivesdale*, | Mechanical Engineering. |
| Haggard, William Thomas, | *Farmer City*, | Classical. |
| Haley, Arthur Fenn, | *Champaign*, | Mech. Engineering. |
| Hamilton, Charles Sinclair, | *Ashland*, | Civil Engineering. |
| Hammers, Jesse, | *Champaign*, | Classical. |
| Hammers, Morgan J, | *Champaign*, | Mech. Engineering. |
| Heath, Noble Porter, Jr. | *White Heath*, | Mech. Engineering. |
| Herman, Fred William, | *Freeburg*, | Electrical Engineering. |
| Herwig, George Washington, | *Mason City*, | Agriculture. |
| Hindman, John, | *Urbana*, | Eng. and Mod. Lang. |
| Hisey, Homer Roy, | *Nashville*, | Natural Science. |
| Hoblit, Charles Timmons, | *Lincoln*, | Electrical Engineering. |
| Horn, Carl John, | *Naperville*, | Architect. Engineering. |
| Howard, George Augustus, Jr., | *Los Angeles, Cal.*, | Arch'l Engineering. |
| Howison, Charles, | *Sandwich*, | Architecture. |
| Hulla, John Edward, | *Chicago*, | Architectural Engineering. |
| Huston, Fred Thales, | *Blandinsville*, | Natural Science. |
| Jewett, Milford Elvin, | *Keokuk, Ia.*, | Architecture. |
| Jones, Walter Wynn, | *Chicago*, | Civil Engineering. |
| Kappes, Edward Fred, | *Chicago*, | Electrical Engineering. |
| Kayler, Samuel Henry, | *Decatur*, | Civil Engineering. |
| King, Wesley Edward, | *Champaign*, | Eng. and Mod. Lang. |
| Kingsland, Norris, | *Media*, | Mechanical Engineering. |
| Kirkpatrick, Harold H, | *Mayview*, | Classical. |
| Kunze, Ewald Edwin, | *Belvidere*, | Civil Engineering. |
| Kruse, Conrad Fred, | *Davenport, Ia.*, | Architecture. |
| Lantz, Simon Everett, | *Carlock*, | Natural Science. |
| Lattan, Harry Haigler, | *Austin*, | Mechanical Engineering. |
| Little, Frank George, | *Mt. Sterling*, | Electrical Engineering. |
| Lutz, Otto Bernard, | *Gardner*, | Electrical Engineering. |
| McConney, Porter David, | *Peoria*, | Mechanical Engineering. |

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|---|---|---|
| McCormick, Olin, | *Gibson City*, | Electrical Engineering. |
| McGalliard, Arthur Gibbs, | *Lincoln*, | Electrical Engineering. |
| McKee, James Harry, | *Chicago*, | Mechanical Engineering. |
| McKnight, Robert Wade, | *Girard*, | Eng. and Mod. Lang. |
| McMullen, Charles, | *Kewanee*, | Civil Engineering. |
| McMullen, Harvey Clinton, | *Kewanee*, | Chemistry. |
| Marker, William Franklin, | *Champaign*, | Architecture. |
| Marsh, Norman Foote, | *Upper Alton*, | Architecture. |
| Maxwell, Irvine William, | *Savoy*, | Electrical Engineering. |
| Maxwell, John Riley, | *Keokuk, Ia.* | |
| Mesiroff, Josef, | *Chicago*, | Electrical Engineering. |
| Mettler, Joseph Ferdinand, | *Rankin*, | Latin. |
| Meyer, Harry, | *Davenport, Ia.*, | Mech. Engineering. |
| Millar, Adam Vanse, | *Mattoon*, | Civil Engineering. |
| Miller, Frank Arthur, | *Chicago*, | Mechanical Engineering. |
| Minnick, Guy Forest, | *Kewanee*, | Mechanical Engineering. |
| Mitchell, George White, | *Chicago*, | Architecture. |
| Morgan, Gilbert Ward, | *Kinmundy*, | Eng. and Mod. Lang. |
| Morgan, Walter Montgomery, | *Kinmundy*, | Eng. and Mod. Lang. |
| Morrissey, Matthew James, | *Champaign*, | Chemistry. |
| †Morse, Albert Cornelius, | *Tremont.* | |
| Mueller, Arnold William, | *Allegheny, Pa.*, | Architecture. |
| Muse, Ernest, | *Metropolis*, | Architecture. |
| Newcomer, Joseph Hardin, | *Petersburg*, | Mechanical Engineering. |
| Noble, Harry Charles, | *Champaign*, | Eng. and Mod. Lang. |
| Ocheltree, Clifford Elwin, | *Homer*, | Eng. and Mod. Lang. |
| Olmstead, Roy, | *Prophetstown*, | Elec. Engineering. |
| Oyler, Harry Schuyler, | *Mt. Pulaski*, | Chemistry. |
| Parker, Walter Asbury, | *Decatur*, | Eng. and Mod. Lang. |
| Patterson, Harold Vincent, | *Tacoma, Wash.*, | Elec. Engineering. |
| Pepper, William Allen, | *Joliet*, | Electrical Engineering. |
| Perry, George Granison, | *Urbana*, | Architecture. |
| Perry, James Alfred, | *Woodstock*, | Architecture. |
| Philbrook, Lowell Mason, | *Normal*, | Electrical Engineering. |
| Phillips, Pren Riley, | *Beecher City*, | Natural Science. |
| Phillips, William Oliver, | *Chicago*, | Architecture. |
| Pinkerton, Cyrus Bertram Eugene, | *Rantoul*, | Classical. |
| Poole, Edward Warren, | *Dover*, | Electrical Engineering. |
| Pratt, Walter Merrill, | *Earlville*, | Mechanical Engineering. |
| Price, Charles Jacob, | *Forreston*, | Chemistry. |
| Prince, Henry Adelbert, | *East Syracuse, N. Y.*, | Architecture. |

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|---|---|---|
| Ray, James Paul, | *Chicago*, | Mining Engineering. |
| Rayburn, Charles Clyde, | *Roseville*, | Eng. and Mod Lang. |
| Read, Frank Albert, | *Lily Lake*, | Eng. and Mod. Lang. |
| Rice, Fred Lee, | *Champaign*, | Eng. and Mod Lang. |
| Riess, John Turk, | *Red Bud*, | Natural Science. |
| Roberts, Arista Irven, | *Danville*, | Eng. and Mod. Lang. |
| Robinson, Glenn, | *Philo*, | Chemistry. |
| Saunders, Rome Clark, | *Champaign*, | Electrical Engineering. |
| Sayers, William Wesley, | *Champaign*, | Mechanical Engineering. |
| Schrader, David Augustus, | *Eliza*, | Engineering. |
| Schroeder, John Lewis, | *Davenport, Ia.*, | Elec. Engineering. |
| Scott, George Harvey, | *Rantoul*, | Eng. and Mod. Lang. |
| Shepardson, Ralph Steel, | *Aurora*, | Architecture. |
| Simmons, Norton Andrews, | *Brighton*, | Electrical Engineering. |
| Sloan, John, | *Brimfield*, | Natural Science. |
| Smith, Albert James, | *Homer*, | Chemistry. |
| Smolt, Alfred Ernest, | *Paw Paw*, | Chemistry. |
| Sperry, James Franklin, | *Champaign*, | Mechanical Engineering. |
| Stare, Burton Reeme, | *Sibley*, | Electrical Engineering. |
| Steinwedell, George Otto, | *Quincy*, | Electrical Engineering. |
| Stibolt, John Peter, | *Davenport, Ia.*, | Architecture. |
| Stone, Lycias Craig, | *Weldon*, | Natural Science. |
| Stone, Lycurgus Hollenbeck, | *Weldon*, | Civil Engineering. |
| Stoolman, Winfield, | *Champaign*, | Architecture. |
| Stuart, Charles Robert, Jr., | *Cairo*, | Electrical Engineering. |
| Taylor, Frederick Dan, | *New Berlin*, | Electrical Engineering. |
| Thompson, Guy Andrew, | *Steward*, | Eng. and Mod. Lang |
| Thornhill, Charles Calaware, | *Champaign*, | Mechanical Engineering. |
| Townsend, Edmund Dell, | *Champaign*, | Electrical Engineering. |
| Trailor, Charles Clifton, | *Gibson City*, | Chemistry. |
| Trevett, Ross Lennington, | *Champaign*, | Electrical Engineering. |
| Trickey, Hardy Deland, | *Winchester*, | Electrical Engineering. |
| Vail, Richard Randolph, | *Lone Tree*, | Civil Engineering. |
| Vaudeventer, Homer Givens, | *Mt. Sterling*, | Agriculture. |
| Vigal, William Myron, | *Edinburg*, | Electrical Engineering. |
| Voris, Alvin Coe, | *Neoga*, | Electrical Engineering. |
| Wallace, John Edgar, | *Neoga*, | Mechanical Engineering. |
| Webber, Hubert Anthony, | *Mt. Vernon*, | Architecture. |
| Weeks, Charles Henry, | *Upper Alton*, | Architecture. |
| Wemhaner, George Adolph, | *Warsaw*, | Electrical Engineering. |
| Willard, Edward, | *Roseville*, | Engineering. |

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|---|---|---|
| Woolner, Edward Sigmund, | *Peoria*, | Electrical Engineering. |
| Wright, Frank Eviss, | *Mahomet*, | Mechanical Engineering. |
| Zimmerman, Walter, | *Champaign*, | Mechanical Engineering. |
| Brownlee, Mary Lavinia, | *Urbana*, | Latin. |
| Buck, Luella Eugenia, | *Champaign*, | Natural Science. |
| Campbell, Maude Permill, | *Urbana*, | |
| Carswell, Jessie Whyte, | *New City*, | Chemistry. |
| Chester, Florence, | *Champaign*, | Eng. and Mod. Lang. |
| Chester, Mary, | *Champaign*, | Eng. and Mod. Lang. |
| Cross, Daisy, | *Rantoul*, | Eng. and Mod. Lang. |
| †Folger, Cloa Tillie, | *Ridge Farm*, | Eng. and Mod. Lang. |
| Henderson, Minnie, | *Ridge Farm*, | Classical. |
| Herme, Marcella, | *Champaign*, | Eng. and Mod. Lang. |
| Kent, Jennie Isabella, | *Urbana*, | Eng. and Mod. Lang. |
| Kerns, Mazie White, | *Champaign*, | Natural Science. |
| Lincoln, Abbie Adelaide, | *Hammond*, | Eng. and Mod. Lang. |
| Mandeville, Elizabeth Elma, | *Philo*, | Natural Science. |
| Mason, Mildred Eliza, | *Plainfield*, | Eng. and Mod. Lang. |
| Merrill, Emily, | *Abilene, Kan.*, | Natural Science. |
| Moore, Minnie Rose, | *French Grove*, | Eng. and Mod. Lang. |
| Moss, Antoinette Leslie, | *Baldwinsville, N. Y.*, | E. and M. Lang. |
| Northam, Lottie Alice, | *Nora*, | Natural Science. |
| O'Bryan, Wilhelmine, | *Champaign*, | Natural Science. |
| O'Neill, Marian Madeline, | *Champaign*, | Eng. and Mod. Lang. |
| Peck, Harriet Stella, | *Fisher*, | Eng. and Mod. Lang. |
| Peck, Millicent Orville, | *Fisher*, | Latin. |
| Raynor, Clara Mae, | *Champaign*, | Classical. |
| Spry, Zua, | *Sidell*, | Classical. |
| Starkweather, Pearl Belle, | *Champaign*, | Eng. and Mod. Lang. |
| Stone, Sarah Effie, | *Weldon*, | Eng. and Mod. Lang. |
| Tower, Blanche Jennie, | *Chana*, | Architecture. |
| Walker, Cora Elizabeth, | *St. Joseph*, | Eng. and Mod. Lang. |
| Webster, Sarah Emeline, | *Champaign*, | Eng. and Mod. Lang. |

## SPECIAL STUDENTS.

| | | |
|---|---|---|
| Allen, James Charles, | *Rockford*, | Architect. Engineering. |
| Andermann, William Fred, | *Lace*, | Agriculture. |
| Atkins, Herbert, | *Lincoln*, | Agriculture. |

† Deceased.

| | | |
|---|---|---|
| Barter, Duncan Mac, | *Attila*, | Agriculture. |
| Brayshaw, Walter Washington, | *Peoria*, | Chemistry. |
| Cunnington, Edwin Ralph, | *Champaign*, | Art and Design. |
| Elliott, Leroy Gleason, | *Brooklyn, Ia.*, | Agriculture. |
| Fairbank, William John, | *St. Louis, Mo.*, | Architecture. |
| Frazier, William Jackson, | *Villa Grove*, | Agriculture. |
| Freeland, David E, | *Bethany*, | Agriculture. |
| Freeland, William Thomas, | *Windsor*, | Agriculture. |
| Gillespie, Thomas Morton, | *Marissa*, | Agriculture. |
| Helms, Edward Samuel, | *Belleville*, | Agriculture. |
| Kamp, John, | *Tolono*, | Agriculture. |
| Kamp, Peter, | *Tolono*, | Agriculture. |
| Keator, William Chauncey, | *Rock Island*, | Chemistry. |
| Leeper, Robert, | *Unionville*, | Agriculture. |
| Lindsay, Thomas Edward, | *Urbana*, | Physics. |
| McFadden, Sidney, | *Time*, | Agriculture. |
| Moody, Samuel Franklin, | *Bethany*, | Agriculture. |
| Moore, Frank, | *Elvaston*, | Agriculture. |
| Morrow, Clarence Gifford, | *Champaign*, | Agriculture. |
| Myers, George Fortune, | *Danville*, | Veterinary Science. |
| Ogden, Joseph, | *Champaign*, | Agriculture. |
| Ogden, Thomas, | *Champaign*, | Agriculture. |
| Osterhage, Louis Henry, | *Vincennes, Ind.*, | Architecture. |
| Pfeil, Charles Oscar, | *Arenzville*, | Architecture. |
| Robison, James Charles, | *El Dorado, Kan.*, | Agriculture. |
| Rock, John Henry, | *Sadorus*, | Agriculture. |
| Saunders, Oliver Clinton Thornton, | *Champaign*, | Chemistry. |
| Schneck, Sereno, | *Mt. Carmel*, | |
| Seavey, Albion Moses, | *Prairieville*, | Agriculture. |
| Shearer, Hallock, | *Gard's Point*, | Agriculture. |
| Skeavington, George, | *Albion*, | Agriculture. |
| Thomas, Bertrand, | *Kickapoo*, | Agriculture. |
| Thomas, Lauren, | *Kickapoo*, | Agriculture. |
| Tilton, James Fredrick, | *Hoopeston*, | Agriculture. |
| Vanderkloot, Marinus Adrain, | *Chicago*, | Art and Design. |
| Wood, Harry Milner, | *Delavan*, | Agriculture. |
| Woulfe Daniel, | *Clarence*, | Agriculture. |
| | | |
| Beattie, Carrol E., | *Champaign*, | Art and Design. |
| Besore, Ida May, | *Urbana*, | Art and Design. |
| Broaddus, Florence Earl, | *Urbana*, | History. |

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|---|---|---|
| Brown, Ina Doane, | *Urbana*, | Art and Design. |
| Carter, Carrie Mabel, | *Champaign*, | Art and Design. |
| Gardner, May Emma, | *Gilman*, | Music. |
| Gillespie, Clara Bell, | *Portland Station, O.*, | Art and Design. |
| Hill, Mary, | *Champaign*, | Music. |
| Hiserodt, Sadie, | *Urbana*, | Art and Design. |
| Leal, Mary Cloelia, | *Urbana*, | Art and Design. |
| McIntosh, Mabel Charlotte Urquhart | *Champaign*, | Modern Languages. |
| McIntosh, Winifred Wilhelmina Stuart, | *Champaign*, | Modern Languages. |
| Paradis, Mrs. Martha Ann, | *Urbana*, | Modern Languages. |
| Richards, Gertrude, | *Urbana*, | Art and Design. |
| Saye, Agnes, | *Champaign*, | Modern Languages. |

# SUMMARY.

| Courses and Classes. | Graduate School. | Resident Graduates | Senior | Junior | Sophomore | Freshman | Preparatory | Special | Total Men | Total Women | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Agriculture, Men | | | 2 | 1 | | 4 | 5 | 29 | 41 | | 41 |
| Mechanical Engineering, Men | | 1 | 3 | 3 | 18 | 28 | 26 | | 79 | | 79 |
| Electrical Engineering, Men. | | | 4 | 11 | 7 | 35 | 36 | 1 | 94 | | 94 |
| Civil Engineering, Men | | 1 | 12 | 15 | 20 | 27 | 17 | | 92 | | 92 |
| Mining Engineering, Men | | | | 2 | 1 | 3 | 1 | | 7 | | 7 |
| Municipal Engineering, Men. | | | | | | 1 | | | 1 | | 1 |
| Architecture — Men | | 1 | 10 | 16 | 17 | 27 | 23 | 3 | 97 | | 99 |
| Architecture — Women | | | | | | 1 | 1 | | | 2 | |
| Architectural Engineer'g, Men | | | | | 6 | 4 | 4 | 1 | 15 | | 15 |
| Chemistry — Men | | 1 | 9 | 6 | 13 | 10 | 10 | 3 | 52 | | 54 |
| Chemistry — Women | | | | | | 1 | 1 | | | 2 | |
| Natural History — Men | 1 | | 7 | 8 | 8 | 13 | 12 | | 49 | | 72 |
| Natural History — Women | 1 | 1 | | 2 | 7 | 6 | 6 | | | 23 | |
| Art and Design — Men | | | | | | | | 2 | 2 | | 10 |
| Art and Design — Women | | | | | | | | 8 | | 8 | |
| Music, Women | 1 | | | | | | | 2 | | 3 | 3 |
| English and Modern Languages — Men | | | 10 | 6 | 7 | 9 | 22 | | 54 | | 106 |
| English and Modern Languages — Women | | | 6 | 3 | 4 | 18 | 16 | 5 | | 52 | |
| Latin — Men | | | 1 | 3 | 2 | 1 | 1 | | 8 | | 13 |
| Latin — Women | | | | 2 | 1 | | 2 | | | 5 | |
| Classical — Men | 1 | | 2 | 1 | 1 | 4 | 6 | | 15 | | 23 |
| Classical — Women | | | 1 | 1 | 1 | 2 | 3 | | | 8 | |
| Not Specified — Men | | | | | | | 3 | 1 | 4 | | 5 |
| Not Specified — Women | | | | | | | 1 | | | 1 | |
| Total — Men | 2 | 4 | 60 | 72 | 100 | 166 | 166 | 40 | 610 | | |
| Total — Women | 2 | 1 | 7 | 8 | 13 | 28 | 30 | 15 | | 104 | |
| Total | 4 | 5 | 67 | 80 | 113 | 194 | 196 | 55 | | | 714 |

# HOLDERS OF SCHOLARSHIPS, PRIZES AND COMMISSIONS.

## HONORARY SCHOLARSHIPS.

The following named counties have been represented during the year by the students named:

| | |
|---|---|
| Adams, | Woodruff, Thomas Tyson. |
| Brown, | Bartlett, Henry Emmett. |
| Bureau, | Bryant, Lester Peck. |
| Champaign, | Marble, Harry Curtis. |
| Clinton, | Earl, Mark Alden. |
| Cook, | Bailey, Leonard Lionel. |
| Crawford, | Templeton, Benjamin Franklin. |
| Douglas, | Carmack, Clyde Robert. |
| Du Page, | Heideman, George Hermann. |
| Ford, | Lowry, James Percival. |
| Hancock, | Ketchum, Richard Bird. |
| Kane, | Shepardson, John Eaton. |
| La Salle, | Sparks, Marion Emeline. |
| Livingston, | Holtzman, Stephen Ford. |
| Marion, | Row, George Edward. |
| Ogle, | Woolsey, Ola C. |
| Peoria, | Beasley, Harrison Eaton. |
| Rock Island, | Johnson, Harriette Augusta. |
| Sangamon, | Porter, Robert Knight. |
| Scott, | Gibbs, William David. |
| Tazewell, | Van Ostrand, Charles Edwin. |
| Washington, | Ayers, Clarence Otto. |
| Whiteside, | Reeves, Harley Edson. |
| Winnebago, | Carpenter, Frank Albert. |

## CHICAGO CLUB LOAN FUND.

Chapman, Paul Reed.
Karpen, Julius.

## WINNERS IN JUNIOR PRIZE SPEAKING CONTEST.

Chambers, William Rock, First Prize.
Lamkin, Nina Belle, Second Prize.
Carter, Charles Willard, Third Prize.

## COMMISSIONED BY THE GOVERNOR AS CAPTAINS BY BREVET IN THE ILLINOIS NATIONAL GUARD, 1892.

Burrows, Park Tunis, Mather, Roy Allen.

## SPECIAL COMMENDATION.

The following have been named to the Secretary of War as worthy of special commendation:

Burrows, Park Tunis, Mather, Roy Allen.

## WINNER OF HAZELTON PRIZE MEDAL, 1892.

Atwood, Levi Patten.

## ROSTER OF OFFICERS AND NON-COMMISSIONED OFFICERS OF THE BATTALION FOR 1892-3.

Major, M. A. Earl; Captain (unassigned), J. T. Stewart.
Adjutant-First Lieutenant, C. W. Noble.
Sergeant Major, W. N. Vance.
Color Sergeant, L. E. Roby.

Co. "A"—First Lieutenant, E. V. Capps; 1st Sergeant, J. A. Green; Corporals, R. P. Brower, G. H. Scott, W. Brenke, M. E. Whitham, J. H. McKee.

Co. "B"—First Lieutenant, F. L. Busey; 1st Sergeant, L. A. MacGregor; Corporals, J. Karpen, L. J. Sexton, W. H. Lienesch, G. A. Howard.

Co. "C"—First Lieutenant, J. E. Shepardson; 1st Sergeant, J. C. Quade; Corporals, F. H. Green, R. K. Porter, C. R. Vickery, H. I. Keck.

Co. "D"—First Lieutenant, A. M. Munn; 1st Sergeant, H. E. Reeves; Corporals, J. T. Riess, G. E. Row, R. P. Manard, C. A. Risor.

Artillery Detachment—Captain, C. D. Brownell; 1st Sergeant, P. B. Randall; Corporal, W. T. Pierce.

Band—C. M. Lewis, Drum Major; R. W. Sharpe, Leader.

## 1893.

### SEPTEMBER.

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| .. | .. | .. | .. | .. | 1 | 2 |
| 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| .. | .. | .. | .. | .. | .. | .. |

### OCTOBER.

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|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| 29 | 30 | 31 | .. | .. | .. | .. |

### NOVEMBER.

| | | | | | | |
|---|---|---|---|---|---|---|
| .. | .. | .. | 1 | 2 | 3 | 4 |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 26 | 27 | 28 | 29 | 30 | .. | .. |

### DECEMBER.

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|---|---|---|---|---|---|---|
| .. | .. | .. | .. | .. | 1 | 2 |
| 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 | .. | .. | .. | .. | .. | .. |

## 1894.

### JANUARY.

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| .. | 1 | 2 | 3 | 4 | 5 | 6 |
| 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| 28 | 29 | 30 | 31 | .. | .. | . |
| .. | .. | .. | .. | .. | .. | .. |

### FEBRUARY.

| | | | | | | |
|---|---|---|---|---|---|---|
| .. | .. | .. | .. | 1 | 2 | 3 |
| 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 25 | 26 | 27 | 28 | .. | .. | .. |

### MARCH.

| | | | | | | |
|---|---|---|---|---|---|---|
| .. | .. | .. | .. | 1 | 2 | 3 |
| 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 25 | 26 | 27 | 28 | 29 | 30 | 31 |

### APRIL.

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| 29 | 30 | .. | .. | .. | .. | .. |
| .. | .. | .. | .. | .. | .. | .. |

## 1894.

### MAY.

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| .. | .. | 1 | 2 | 3 | 4 | 5 |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| 20 | 21 | 22 | 23 | 24 | 25 | 26 |
| 27 | 28 | 29 | 30 | 31 | .. | .. |
| .. | .. | .. | .. | .. | .. | .. |

### JUNE.

| | | | | | | |
|---|---|---|---|---|---|---|
| .. | .. | .. | .. | .. | 1 | 2 |
| 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 24 | 25 | 26 | 27 | 28 | 29 | 30 |

### JULY.

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| 29 | 30 | 31 | .. | .. | .. | .. |

### AUGUST.

| | | | | | | |
|---|---|---|---|---|---|---|
| .. | .. | .. | 1 | 2 | 3 | 4 |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 26 | 27 | 28 | 29 | 30 | 31 | .. |
| .. | .. | .. | .. | .. | .. | .. |

## 1894.

### SEPTEMBER.

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| .. | .. | .. | .. | .. | .. | 1 |
| 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| 23 | 24 | 25 | 26 | 27 | 28 | 29 |
| 30 | .. | .. | .. | .. | .. | .. |

### OCTOBER.

| | | | | | | |
|---|---|---|---|---|---|---|
| .. | 1 | 2 | 3 | 4 | 5 | 6 |
| 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| 28 | 29 | 30 | 31 | .. | .. | . |

### NOVEMBER.

| | | | | | | |
|---|---|---|---|---|---|---|
| .. | .. | .. | .. | 1 | 2 | 3 |
| 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 25 | 26 | 27 | 28 | 29 | 30 | .. |

### DECEMBER.

| | | | | | | |
|---|---|---|---|---|---|---|
| .. | .. | .. | .. | .. | .. | 1 |
| 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| 23 | 24 | 25 | 26 | 27 | 28 | 29 |
| 30 | 31 | .. | .. | .. | .. | .. |

# THE UNIVERSITY CALENDAR.

## 1893–94.

### FALL TERM—1893.

| | |
|---|---|
| Sept. 11, Monday. | Entrance examinations begin. |
| Sept. 11, 12, Monday and Tuesday. | Registration Days. |
| Sept. 13, Wednesday. | Instruction begins. |
| Nov. 30, Thursday. | Thanksgiving Recess. |
| Dec. 4, Monday. | Instruction resumed. |
| Dec. 18, Monday. | Term Examinations begin. |
| Dec. 20, Wednesday. | Term ends. |

### WINTER TERM—1894.

| | |
|---|---|
| Jan. 2, Tuesday. | Entrance Examinations. |
| Jan. 2, 3, Tuesday and Wednesday. | Registration Days. |
| Jan. 4, Thursday. | Instruction begins. |
| Jan. 8, Monday. | Latest date for announcing Subjects of Theses for Baccalaureate Degrees. |
| March 19, Monday. | Term Examinations begin. |
| March 20, Tuesday. | Term ends. |

### SPRING TERM—1894.

| | |
|---|---|
| March 19, 20, Monday and Tuesday. | Registration Days. |
| March 21, Wednesday. | Instruction begins. |
| April 16, Monday. | Latest day for presenting Conklin Orations. |

| | |
|---|---|
| April 28, Saturday. | Latest day for presenting Commencement Theses and Orations. |
| May 24, Thursday. | Senior Examinations begin. |
| May 28, Monday. | Hazelton Prize Drill. |
| May 29, Tuesday. | Competitive Drill. |
| May 30, Wednesday. | Term Examinations begin. |
| June 3, Sunday. | Baccalaureate Address. |
| June 4, Monday. | Class Day. |
| June 5, Tuesday. | Alumni Day.<br>Conklin Prize Orations. |
| June 6, Wednesday. | Twenty-third Annual Commencement. |

FALL TERM—1894.

| | |
|---|---|
| Sept. 10, Monday. | Entrance Examinations begin. |
| Sept. 10, 11, Monday and Tuesday. | Registration Days. |
| Sept. 12, Wednesday. | Instruction begins. |
| Nov. 29, Thursday. | Thanksgiving Recess. |
| Dec. 3, Monday. | Instruction resumed. |
| Dec. 20, Thursday. | Term Examinations begin. |
| Dec. 21, Friday. | Term ends. |

# CHANGES IN ARCHITECTURAL COURSE.

The Board of Trustees at its meeting held July 5, 1893, authorized a very important change in the course of study in architecture, which will take effect at the beginning of the next fall term.

This consists in the omission of the second or sophomore year of mathematics, substituting therefor a year of work in advanced drawing and designing, as follows :

3½. The Architectural Orders.—Exercises in drawing the five orders of architecture in general and detail. Applications to a series of practical problems in architectural design requiring the use of the orders in various combinations. *Any approved work on the five orders. Fall term, full study.* Professor RICKER and Mr. GUNN.

*Required:* Architecture, 2.

11½. Requirements and Planning of Buildings.—A study of the varied requirements of buildings erected for the more important purposes with exercises in making sketch plans for selected programmes. Block plans, grouping of parts, light courts, communications, economical and durable construction, approximate cost and rentals, etc. *Lectures, with illustrations and references to architectural library and cabinet. Winter term, full study.* Professor RICKER and Mr. GUNN.

*Required:* Architecture, 2, 4, 5.

5a. History of Architecture (Details).—Exercises in drawing at large scale the most important details of the Grecian, Roman, Early Christian, Byzantine, Mohammedan, Romanesque, Gothic, and Renaissance styles. Sketch designs for specified problems will also be made in each style, for practice in the use of the styles. *Lectures, with references to architectural library and cabinet. Spring term, full study.* Professsor RICKER and Mr. GUNN.

*Required:* Architecture, 2, 3½, 4a, 5.

The instruction in mechanics and resistance of materials (pages 53 and 54), will also require modification by the use of algebraic methods instead of the calculus, as follows :

1½. Applied Mechanics.—To be taken instead of analytical mechanics. The course of study and topics studied will be nearly identical. *Peck's Elementary Mechanics. Full term, full study.* Assistant Professor MYERS.

*Required:* Mathematics, 2, 4, 6.

2½. Strength of Materials.—To be taken instead of resistance of materials. The course of study will be nearly the same, though somewhat simplified. *Merriman's Mechanics of Materials. Winter term, full study.* Assistant Professor MYERS.

*Required:* Mathematics, 2, 4, 6; Mechanics, 1½.

The course of study in architectural engineering is unchanged, except in the arrangement of the studies.

### ARCHITECTURAL COURSE.

#### FIRST YEAR.

1. Advanced Algebra; Elements of Draughting; Shop Practice; French, German, or English; Military.
2. Trigonometry; Descriptive Geometry and Lettering; Shop Practice; French, German, or English; Military.
3. Analytical Geometry; Advanced Descriptive Geometry; Shop Practice; French, German, or English; Military.

#### SECOND YEAR.

1. Applied Mechanics; Wood Construction; Physics; Military.
2. Strength of Materials; Stone, Brick, and Metal Construction; Physics; Military.
3. Roofs; Sanitary Construction; Physics, Military.

#### THIRD YEAR.

1. History of Architecture; Architectural Orders; Free Hand Drawing or Modeling; Themes and Elocution.
2. History of Architecture; Architectural Drawing (methods of finishing); Free Hand Drawing or Water Coloring; Themes and Elocution.
3. History of Architecture (details); Architectural Drawing (office work); Free Hand Drawing or Sketching; Themes and Elocution.

#### FOURTH YEAR.

1. Superintendence, Estimates, and Specifications; Architectural Perspective; Chemistry; Thesis.

2. Heating and Ventilation; Architectural Design (residences); Requirements and Planning of Buildings; Thesis.
3. Esthetics of Architecture; Architectural Design (problems); Surveying; Thesis.

### Architectural Engineering Course.

#### FIRST YEAR.

1. Advanced Algebra; Elements of Draughting; Shop Practice; French, German, or English; Military.
2. Trigonometry; Descriptive Geometry and Lettering; Shop Practice; French, German, or English; Military.
3. Analytical Geometry; Advanced Descriptive Geometry; Shop Practice; French, German, or English; Military.

#### SECOND YEAR.

1. Differential Calculus; Wood Construction; Physics; Military.
2. Advanced Analytical Geometry; Stone, Brick and Metal Construction; Physics; Military.
3. Integral Calculus; Sanitary Construction; Physics; Military.

#### THIRD YEAR.

1. Analytical Mechanics; History of Architecture; Chemistry; Themes and Elocution.
2. Resistance of Materials; History of Architecture; Architectural Drawing (methods of finishing); Themes and Elocution.
3. Roofs; Hydraulics; Architectural Drawing (office work); Themes and Elocution.

#### FOURTH YEAR.

1. Masonry Construction; Superintendence, Estimates, and Specifications; Architectural Perspective; or Advanced Graphics; Thesis.
2. Bridge Analysis; Heating and Ventilation; Architectural Design (residences); Thesis.
3. Bridge Design; Surveying; Architectural Design (problems); Thesis.

# INDEX.